

JOINT COMMITTEES WORKSHOP  
BEFORE THE  
CALIFORNIA ENERGY RESOURCES CONSERVATION  
AND DEVELOPMENT COMMISSION

In the Matter of: )  
 )  
Informational Proceeding and )  
Preparation of the 2004 Integrated) Docket Nos.  
Energy Policy Report (IEPR) Update) 03-IEP-01  
 ) 02-REN-1038  
Re: Accelerated Renewable Energy ) 04-DIST-GEN-1  
Development (Renewable Distributed)  
Generation )  
\_\_\_\_\_)

CALIFORNIA ENERGY COMMISSION  
1516 NINTH STREET  
HEARING ROOM A  
SACRAMENTO, CALIFORNIA

TUESDAY, JUNE 8, 2004

10:05 A.M.

Reported by:  
Peter Petty  
Contract No. 150-01-005

PETERS SHORTHAND REPORTING CORPORATION (916) 362-2345

COMMISSIONERS PRESENT

John Geesman, Presiding Member

Jackalyne Pfannenstiel, Associate Member

ADVISORS PRESENT

Melissa Ann Jones

Darcie Houck

STAFF PRESENT

Timothy Tutt

Sandra Fromm

ALSO PRESENT

Drew Bohan  
California Environmental Protection Agency

Larry Stoddard  
Ryan Pletka  
Black & Veatch

Stephen Frantz  
Sacramento Municipal Utility District

Stephen Heckerorth

Dave Nyberg  
GE Energy

Kent Sheldon  
SMA America, Inc.

Sheryl Carter  
Natural Resources Defense Council

Tom Blair  
The City of San Diego

Jan MacFarland  
CSEIA

ALSO PRESENT

Bernadette Del Chiaro  
Environment California Research and Policy Center

Robert Raymer  
California Building Industry Association

Mark Robinson  
NEXTEK Power Systems, Inc.

Michael Bergey  
Bergey WindPower

Donald E. Osborn  
Spectrum Energy, Inc.

Jane H. Turnbull  
League of Women Voters

Joseph McCabe  
Energy Ideas, LLC

Kenneth Nittler  
Enercomp

Aaron Nitzkin  
Sharp Electronics Corporation

Cecilia Aguillon  
Kyocera Solar, Inc.

Tor Allen  
The Rahus Institute

Ben Ovshinsky  
Energy Conversion Devices, Inc.

Kari Smith  
Powerlight

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## 1 P R O C E E D I N G S

2 10:05 a.m.

3 PRESIDING MEMBER GEESMAN: I'm John  
4 Geesman, the Presiding Member of the Commission's  
5 Integrated Energy Policy Report and the  
6 Commission's Renewables Committee. This is a  
7 joint workshop of both Committees.

8 To my left is our newest Commissioner,  
9 Commissioner Pfannenstiel, who is the Associate  
10 Member on our Renewables Committee. To my right  
11 is my Advisor, Melissa Jones. To my far left is  
12 Darcie Houck, who is Commissioner Boyd's Advisor.  
13 Commissioner Boyd is the Associate Member on our  
14 Integrated Energy Policy Report.

15 We've got a full agenda today. I think  
16 the staff has assembled some fairly provocative  
17 questions that we'll be hearing a number of  
18 presentations from.

19 I had the privilege last week of being  
20 included in a delegation of state governments that  
21 attended the International Renewable Energy  
22 Conference in Bonn, Germany. And I will say it  
23 was a unique experience to watch the 170 other  
24 countries represented at this conference stand up  
25 on the floor and make fairly solemn commitments as

1 to the nature of their renewable energy programs  
2 going forward.

3 Given the international prominence which  
4 our Governor enjoys, and some of the visible  
5 statements and indications that he's made early in  
6 his term about accelerating, and perhaps  
7 expanding, state's renewable energy program,  
8 California was obviously a subject of considerable  
9 interest among the delegates.

10 We'll hear from the Administration a  
11 little bit later in our presentation. We'll start  
12 with an overview from Tim Tutt. But first,  
13 Commissioner Pfannenstiel, do you wish to say  
14 anything?

15 COMMISSIONER PFANNENSTIEL: Only that I  
16 am most anxious to hear a lot more about what is  
17 happening, what can be happening with these  
18 programs. I'm expecting to hear a lot about costs  
19 and about the benefits, and how the one can be  
20 reduced and the other can be increased.

21 So, with that I'll turn it over to the  
22 experts. Thank you.

23 PRESIDING MEMBER GEESMAN: Tim, do you  
24 want to start.

25 MS. FROMM: I was just going to do a



1       little bit of housekeeping.

2               PRESIDING MEMBER GEESMAN:   Okay.

3               MS. FROMM:   I'm Sandra Fromm; I'm the  
4       Assistant Project Manager for the 2004 Integrated  
5       Energy Policy Report.   I'd like to welcome you  
6       here today and thank you for your participation in  
7       this workshop.

8               Today's workshop is on distributed  
9       generation, which is one of three elements in the  
10      2004 update.   And we'll be also updating you on  
11      transmission and aging power plants when the  
12      report comes out.

13              I would encourage you to subscribe to  
14      our IEPR list server.   We send our workshop  
15      notices electronically through that.  
16      Presentations made by staff and other participants  
17      here today will also be posted on our website.

18              Paper copies of our presentations,  
19      staff's presentations, and also by participants,  
20      are available out on the table in the front lobby.

21              If you have any comments, written or  
22      oral, that you would like to make, please make  
23      them by June 15th of 2004.

24              With that, I'd like to take care of a  
25      few other little things.   When you come up to the

1 podium if you could speak directly into the  
2 microphone; they're a little bit sensitive. That  
3 would be very helpful for our court reporter so  
4 that he can get an accurate record of the  
5 proceedings.

6 And if you can state your name and  
7 provide the court reporter with a business card,  
8 that would be helpful. We have restrooms and  
9 water fountains outside of the hearing room to the  
10 left. And there's a snack and lunch shop upstairs  
11 on the second floor. There's also a market across  
12 the street where you can pick up something for  
13 lunch.

14 I would ask for your courtesy to turn  
15 off your cellphones. They are very distracting to  
16 the audience and to speakers.

17 With that, I'd like to turn the thing  
18 over to Tim Tutt.

19 MR. TUTT: Thank you, Sandra. Welcome  
20 to the distributed generation/renewable  
21 distributed generation workshop. I'm going to go  
22 through a broad overview of the solar market and  
23 funnel down to our own program; to some degree  
24 talk about some of the issues and policies in  
25 California.

1           The agenda for today is presentations in  
2           the morning generally. I think we have as many as  
3           eight presentations. There's a few that are not  
4           on the agenda that came in at the last minute here  
5           that we'll hear from, including a presentation  
6           from NEXTEK and a presentation from Mike Bergey.

7           There probably are some people who wish  
8           to just make public comments, and we'll either do  
9           those as part of the presentations, or do those as  
10          part of the roundtable, however it seems to fit, I  
11          think, at this point in time.

12          The agenda and workshop notice that we  
13          sent out talked about a variety of broad questions  
14          and issues. Program and policy coordination in  
15          California; the status and strategies for  
16          renewable distributed generation markets; what's  
17          happening in Germany and Japan.

18          Some of the other policies in  
19          California, net metering, tax credits and  
20          exemptions expiration and solar systems on new  
21          homes, as a burgeoning, perhaps new, venture in  
22          California.

23          And many people have called me and asked  
24          when this workshop would adjourn, and given the  
25          number of people and items on the agenda I'm

1       afraid I can't give a definite answer to that at  
2       this point in time.

3               This chart shows you a comparison of  
4       Japan, German, California in terms of the  
5       photovoltaic energy market, which is a significant  
6       component of our distributed generation programs  
7       here in California. We also cover a variety of  
8       other technologies, but photovoltaic tends to  
9       dominate the distributed generation renewable  
10      market.

11             As you can see, both Japan and Germany  
12      have more population than California. They both  
13      import more of their energy than the United  
14      States. And electricity prices there are higher  
15      than in California.

16             What this means is in part a basis for  
17      one of the reasons Japan and Germany are  
18      significantly ahead of California in basic  
19      installation of photovoltaics. The amount of 2003  
20      installations, Japan's done over 200 megawatts;  
21      Germany is almost 150 in 2003. California, we  
22      installed about 27, I believe.

23             Cumulatively, Germany and Japan, again,  
24      are ahead of California. We did this on a per  
25      capita basis. It wouldn't look like we're so

1       severely behind because PV per person, we catch up  
2       a little bit.

3               And one of the goals of our programs, in  
4       general, Japan, Germany and here, is to reduce the  
5       costs of these systems using economies of scale  
6       and other advances in manufacturing technology.  
7       And you can see that in Germany and Japan there  
8       have been significant reductions in the costs of  
9       photovoltaics. In California we've had some since  
10      1999, but not as much as in Germany and Japan.

11             Another chart showing the Japanese PV  
12      experience. They started providing subsidies,  
13      incentives to photovoltaic installations in '94.  
14      The blue bars on this chart are effectively the  
15      incentive amount, and the purple bars are the cost  
16      of the system amounts.

17             So, in '94, '95', '96, '97 Japan was  
18      subsidizing more than 50 percent of the cost of  
19      these systems. And then in the last few years, as  
20      the program has taken off and expanded, they  
21      install over 40,000 residential or small systems a  
22      year these days. The amount of subsidy has  
23      decreased as the system price as decreased.

24             All in all, Japan is spending -- the  
25      yellow chart line on this chart is in yen, it's

1       the subsidies budget in Japan -- is equivalent to  
2       about 200 million a year in these last four or  
3       five years. They've spent over a billion dollars  
4       in subsidies on photovoltaics; and they're ramping  
5       out their incentive programs this year and next  
6       year for purposes of providing these kind of  
7       incentives.

8               German PV experience is similar.  
9       There's not a lot of growth until 2000, 2001,  
10      2002, when the -- law started really. And we see  
11      about 130 megawatt expected, or put in place in  
12      2003 on this chart. And cumulatively, 120  
13      megawatts of PV.

14             So, Germany and Japan have had good  
15      experiences. In California we have several  
16      programs in the state that provide incentives to  
17      photovoltaic installations. There's our own  
18      emerging rebate program or there's the California  
19      Public Utilities Commission self-generation  
20      incentive program. And several of the publicly  
21      owned utilities have programs of their own.

22             In terms of how these programs affect  
23      the overall PV market in the state, the Energy  
24      Commission's program, to date, has installed 46  
25      percent of the photovoltaics megawatts. The self-

1 generation incentive program at the PUC is next at  
2 23 percent; and SMUD is 15 percent.

3 So there's three or four big programs.  
4 And one of the issues that we need to talk about  
5 today is how these programs get coordinated in  
6 greater detail as we move into the more robust PV  
7 market, so that we don't end up stepping on each  
8 other's toes and causing the discrepancies in each  
9 other's markets or each other's parts of the  
10 system here.

11 Other policies that California has had  
12 in place, and we'll talk about later, net metering  
13 up to 1 megawatt in California; CRS exemptions;  
14 property tax exemptions for solar, not for small  
15 wind, for example. We do a lot of research and  
16 development of solar, spend money on that. And on  
17 distributed generation, renewable distributed  
18 generation, in general.

19 And then California, as you might  
20 probably know, has a 7.5 percent income tax credit  
21 this year on the net cost of installing a solar  
22 system up to 200 megawatts.

23 So, all of these policies we'll talk  
24 about hopefully during this meeting, to some  
25 degree. Several of them are, again, at a point

1       where the demand has been strong enough that the  
2       caps or the amount of incentive coming from these  
3       policies is potentially challenged; income tax  
4       credit disappears at the end of next year, is  
5       currently scheduled to.

6               And through all of these policies and  
7       programs we've achieved a fairly dramatic growth  
8       in solar in California. We have 75 megawatts  
9       online grid-connected solar online right now. And  
10      the rate of growth is fairly significant through  
11      the rest of this year. We can easily get up into  
12      the 90 megawatt, 100 megawatt range in California.

13             The emerging renewables program, which  
14      is run here at the Energy Commission, has had the  
15      goal of accelerating cost reduction and market  
16      acceptance through high-volume production. We  
17      feel like we have achieved a significant success  
18      there in that we have had quite an increase in the  
19      amount of solar installed in California through  
20      our program and others. We have had some cost  
21      reductions. We would expect to see more as we  
22      move forward.

23             Our success has challenged us in the  
24      sense that we're now at a point where we have to  
25      think about the continued funding for the program,



1 moving into the next couple years and beyond.

2 It's going to be one of the topics of the meeting  
3 today.

4 We provide rebates for these programs.  
5 Basically our rebate level right now is \$3.20 a  
6 watt for photovoltaic, expected to go down to \$3  
7 on July 1st, and it declines every six months.  
8 That's the way our program is structured.

9 There's several eligible technologies,  
10 including small wind, fuel cells using noble fuels  
11 and solar-thermal electric. But PV is probably 95  
12 to 98 percent of our program at this point.

13 By early 2004 we've paid over about \$150  
14 million for close to 10,000 systems and 38  
15 megawatts of distributed generation. And we have  
16 a significant amount of funds encumbered for  
17 systems in development.

18 We have about 86 million remaining as of  
19 June 1, 2004. And I'll get into more specifics of  
20 future funding issues as we move forward in this  
21 presentation, this overview presentation.

22 This shows you the growth in the number  
23 of systems installed per year. 2003 we had over  
24 3000 systems and 13 megawatts installed, for a  
25 total of 52 million in incentives. So far through

1       2004, only half the year is gone, we've nearly  
2       exceeded the total for 2002 in number of systems;  
3       have exceeded the total in megawatts, and have  
4       exceeded the total in incentive payments. Again,  
5       for the grand total of 37 megawatts installed to  
6       date.

7               This chart again shows you the level --  
8       a huge change in the level of demand or growth in  
9       the market in California. This is the number of  
10      retailers and installers in each year that we have  
11      participating in our program. It's gone down in  
12      2004, in part because we asked everyone to re-  
13      register on our site in 2004. And you can see,  
14      the red bars there show our rebate levels which  
15      went up in 2001 to 4.50 a watt, and then have been  
16      declining since then as we move into, again, a  
17      declining mode of incentive payments; trying to  
18      move to a period where the industry doesn't need  
19      an incentive subsidy anymore, like Japan has done.

20             Again, this shows the requested funding  
21      per month, and the point in this graph is it shows  
22      the big spikes at the points where our rebate  
23      levels decline, in December and June of each year.  
24      This pattern of decline of 20 cents started in  
25      March of 2003. There's a gap, as many of you

1 know, between October and February of 2003 where  
2 we were out of funds for the program.

3 And you can see here, at the very end of  
4 this year, January through May, we're seeing an  
5 increase in incentive requests again. We don't  
6 have the June results in, obviously June's not  
7 over, but it looks like we're on track perhaps to  
8 have another spike like we've seen in the previous  
9 rebate level of decline periods. Just before that  
10 we get a big spike in reservations.

11 So, what does this mean in terms of  
12 total funding? Historically we started out with  
13 54 million of funding in the program. And for  
14 several years, 1998 through 2000, end of 2000, it  
15 wasn't decreasing very fast. I think we had spent  
16 or reserved about 10 million. By the end of 2000  
17 it had 44 million left.

18 But in 2001, when the energy crisis hit,  
19 there certainly was an increase in interest in  
20 solar. The Legislature provided some additional  
21 funding for our program. We re-allocated some  
22 funding from other parts of our renewable energy  
23 program. And that's where you get a bump up in  
24 the funding here. And you see that the growing  
25 gap between the available funding and the -- I'm

1       sorry, the total funding and the available funds  
2       left, indicates the amount that was installed in  
3       reserve in this period. Reaching a point where we  
4       actually ran out of funds in October of 2002, as I  
5       mentioned.

6               Now, one reason we ran out of funds was  
7       because we didn't have authority to spend this  
8       next batch of funding, yet, in the program. It  
9       was established that we had this money coming in,  
10      but we hadn't authority to spend it until 2003.

11             Once we started that program up, and  
12      allocated those funds, there were funds available  
13      again. But, as you see, the rate of using those  
14      funds up has been pretty steep, to the point where  
15      we realized that we were going to be out of  
16      funding again fairly quickly, and earlier this  
17      year added a significant amount of additional  
18      funds to the program. And you see that here and  
19      see that it's available, but it's also declining.

20             Now, this yellow period is a project,  
21      kind of, for the rest of the year. It shows that  
22      we probably will still have funds at the end of  
23      the year, but it is just a projection. It's not  
24      clear exactly how steep this rate of use of funds  
25      will be, but we're looking at probably being okay

1 with the money we put in through the end of this  
2 year.

3 In terms of again our price trends for  
4 installed PV systems. We had sort of a mixed  
5 record in terms of how the prices and the average  
6 were changing in the early part of the program.  
7 And, in fact, as we went up to a 4.50 rebate level  
8 we saw an increase in the amount of the cost per  
9 kilowatt of these systems.

10 But as we've moved forward from then  
11 we've seen a drop in cost per watt; including a  
12 big drop last year. We expect to see further  
13 drops, in part because we've gotten rid of the  
14 percent requirement on our rebate structure. The  
15 structure used to be that you got a certain  
16 dollars per watt level, or 50 percent of your  
17 costs. We got rid of the 50 percent of the costs  
18 structure, and revised our rebate levels  
19 appropriately so that there was no longer an  
20 incentive to put in a system to get as maximum a  
21 rebate as possible.

22 This chart shows you a little bit of the  
23 breakdown between commercial, residential retrofit  
24 and residential new in our program. We had a  
25 significant, and still have a significant amount

1 of commercial systems. These are probably greater  
2 than 20 kW systems.

3 Here in 2001 it was even up to larger  
4 systems, because we funded several systems up to 1  
5 megawatt in 2001. Before we ran out of money we  
6 had allocated to those larger systems. And then  
7 in 2002 we no longer had funds for those larger  
8 systems. And in 2003 our program was restructured  
9 so that it only funded up to 30 kW while the self-  
10 generation incentive program funded systems above  
11 30 kW.

12 You can see here also on this chart a  
13 growing amount, or decent amount of residential  
14 new construction installations or reservations in  
15 our program. And this is significant because, as  
16 you know, the Governor has suggested in the State  
17 of the State speech that he wants to encourage  
18 builders to put solar on new homes. And this is  
19 an area where any program the Governor does roll  
20 out in that vein would interact with and need to  
21 be coordinated with our program.

22 So bottomline is what's happening in  
23 2005 and 2006 for us. As I said, we probably have  
24 money to the end of 2004. In 2007 we will  
25 hopefully have authorization to allocate and use

1 the last five years worth of the AB-995/SB-1194  
2 funding, which is about \$220 million, depending on  
3 escalation of program funds.

4 So at that point, pending legislation  
5 available or allowing us to use those funds, we  
6 should have an additional 220 million. But until  
7 then we have to either find sources of funding or  
8 change the program to react to the fact that the  
9 funding is limited.

10 Here's a couple or three scenarios that  
11 just nothing definitive in terms of what we expect  
12 to happen in here, but just to show you where we  
13 might be under three or four scenarios.

14 In this first one, the top one, we end  
15 up needing about \$20 million -- being \$20 million  
16 in the red, so we need to allocate from somewhere  
17 another \$20 million. This scenario assumes a more  
18 rapid rebate decline, about twice as fast as we  
19 currently are declining the rebate. And as a  
20 result, we're merely sustaining, perhaps, the  
21 industry, and getting significantly less  
22 megawatts, spending significantly less dollars  
23 than if we were to continue the program as it's  
24 currently structured.

25 The yellow line continues the program as

1       it's currently structured, with a 20 cent rebate  
2       drop every six months; and assumes that the level  
3       of participation in the program remains about the  
4       same as it was, has been this year. And so we end  
5       up needing about \$140 million by the end of 2006  
6       for the program to maintain the level that we  
7       currently are at.

8               And the turquoise line shows you what  
9       would be expected if, as costs in the industry  
10      continue to come down, we might achieve and see  
11      additional growth in the program as we have in the  
12      last -- over the last few years. And get further  
13      requests for reservations; install a larger amount  
14      of megawatts, using about \$300 million and  
15      requiring about \$250 million in new funding over  
16      the next two years.

17             So these are daunting prospects and  
18      possible scenarios. We don't know which way to  
19      go. We're looking for input and trying to provide  
20      some perspective on where the situation stands in  
21      this workshop and presentation today.

22             In terms of net metering caps, one of  
23      the issues that has been in the news recently is  
24      San Diego coming close to its net metering cap.  
25      PG&E and Southern California Edison are not as



1 close as San Diego.

2 Basically in AB-58 when it re-  
3 established net metering for up to 1000 megawatts  
4 in California, also established a cap of net  
5 metering equivalent to one-half of 1 percent of  
6 the electricity load of each service area. And  
7 San Diego is coming close enough to that cap that  
8 there's interest in trying to see what can be done  
9 about it.

10 The cap doesn't apply to LADWP. We show  
11 it on this chart because just to give you an idea  
12 of where they would be if it did apply, but LADWP  
13 is exempt from AB-58.

14 And it's not -- we show it for SMUD.  
15 SMUD appears to be very close, but we're not  
16 exactly clear how it's applied in SMUD at this  
17 point in time.

18 In terms of what's been happening with  
19 the state solar tax credit, there's been an  
20 increasing participation number of tax returns  
21 that have participated; 3000 in 2003, for a total  
22 of \$5 million of credits applied to the systems  
23 involved.

24 And that just is a, you know, it's sort  
25 of a pot pourri of information about where the

1 solar market is and what's been happening.  
2 There's certainly other things we can talk about,  
3 and other presentations that we have here.  
4 There's some contact information here if you need  
5 it.

6 And let me bring up the next  
7 presentation, which will be -- we're going to get  
8 a few words from Drew Bohan of Cal-EPA. And he  
9 doesn't have an electronic presentation, but he's  
10 going to talk and tell us about what's been  
11 happening at Cal-EPA.

12 MR. BOHAN: Thanks, Tim. Good morning,  
13 Commissioners. My name is Drew Bohan, and I'm  
14 Assistant Secretary for Policy at Cal EPA. I  
15 thought I was going to be on at 1:00 this  
16 afternoon, but I don't have a whole presentation  
17 anyway, so it doesn't really make a difference.

18 Just wanted to say thank you to CEC for  
19 holding this forum, and I think it's obviously  
20 something that a lot of people have a lot of  
21 interest in.

22 I'm here really just to listen and learn  
23 from the CEC, as well as those in the audience  
24 who, I'm sure, will have a number of questions as  
25 the presentations go on today.

1                   I started with Cal EPA a couple months  
2           ago, and most of you in the room are probably  
3           familiar with the Governor's statement in the  
4           State of the State Address, that he would support  
5           solar -- support builders in installing solar on  
6           new homes.

7                   And so my boss, Secretary Tamminen,  
8           asked me to sort of survey the California universe  
9           of solar players, and sort of get a sense of who's  
10          doing what and what the various policy options  
11          might be. And so, with a few other staff members,  
12          I've been doing that.

13                  In the meantime the Governor, as you  
14          also know, appointed a new Commissioner, and also  
15          appointed at the Resources Agency, which, of  
16          course, is sort of the bigger entity of which CEC  
17          is a member, appointed an energy advisor; his name  
18          is Joe Desmond. And he's going to be taking the  
19          lead on the big energy puzzle.

20                  And then Shannon Eddy is sitting in the  
21          audience here. Shannon, wave. Shannon was the  
22          third of the main energy appointees; and she is  
23          working chiefly on renewables issues and is going  
24          to be working, I think, chiefly with the PUC.

25                  When this first got set up I thought I

1       may be able to provide a little more detail to  
2       folks. But given that the new energy people have  
3       come on, and that the Administration is in the  
4       process of sort of formulating a specific policy,  
5       there isn't really much detail to share with you.

6               So, I wanted again to say thank you, and  
7       let you know that this is being looked at, but  
8       there is nothing really -- I wish I had something  
9       real specific I could show you with a PowerPoint,  
10      but there just isn't anything like that yet.

11             Thank you.

12             PRESIDING MEMBER GEESMAN: Thanks, Drew.  
13      Tim, are you going to be the master of ceremonies,  
14      or am I to simply read off our agenda list?

15             MR. TUTT: I can be master of  
16      ceremonies, I'm happy to do that. I believe Black  
17      and Veatch is next. Larry Stoddard or Ryan  
18      Pletka, or both.

19             MR. STODDARD: Good morning; my name is  
20      Larry Stoddard, and I am a Senior Project Manager  
21      in Renewable Energy at Black & Veatch.

22             My colleague, Ryan Pletka, and I are  
23      going to chat a little bit here, first of all give  
24      you a brief introduction to Black & Veatch, just  
25      so you know who we are. I am going to talk a

1       little bit about solar photovoltaics, and this is  
2       going to be some perceptions that I have in terms  
3       of reliability, life, capacity, efficiency and  
4       cost. And then Ryan's going to talk about some  
5       projects that we have going with the Palmdale  
6       Water District having to do with renewables.

7               Black & Veatch, just briefly here, is  
8       100-year-old company, global consulting,  
9       engineering, construction firm. We do about \$2  
10      billion a year in annual revenues. And we  
11      specialize in the three sectors, energy, water and  
12      information.

13             We have a virtual organization that's  
14      worldwide, not all together working on renewable  
15      energy, of about 40 people; of which we have six  
16      offices here in California. And one particularly  
17      that works on renewables here in California would  
18      be our hydroelectric group that's got an office  
19      here in Sacramento.

20             And we're working on a number of  
21      California projects, including the Palmdale  
22      project that Ryan's going to talk about.  
23      Renewable energy projects from a few kilowatts up  
24      to the 120 megawatt Pinetree wind project.

25             I'm going to talk a little bit about

1        photovoltaics, and that's part of my background.  
2        I have a long history in solar, and a fairly long  
3        history in photovoltaics. When I was thinking  
4        about these comments I hadn't read yet -- didn't  
5        read it until I was on the airplane coming out  
6        here -- a report that was done called Onsite  
7        Verification Report, Phases 1, 2 and 3, done by  
8        Regional Economic Research incorporated out of  
9        Vancouver for the CEC that's a very nice document  
10       that addresses some of the concerns that I have.

11                But I hear people talking about all the  
12       megawatts of solar that we have installed. And  
13       the question that I have is how well are they  
14       working, and are they really running. And what's  
15       the capacity of photovoltaics that we have  
16       actually operating, not the capacity that we think  
17       we installed, but the capacity we have operating.

18                I have, over here, a conceptual chart.  
19       This is not based on hard data at all, but just  
20       kind of a conceptual. And I'm going to drop down  
21       to the final bullet here and just make this  
22       comment. Not every system will operate 20 years  
23       or even 10 years. And it's completely possible  
24       that after 10 years you might have what we have  
25       here, as we're saying residential, might have this

1 percentage of the systems operating. And by the  
2 time you get to 20 years maybe it's down here; and  
3 30 years, way down there.

4 And we see that PV module life, the  
5 warranties and everything are quite good. But the  
6 Achilles Heel is inverters. And the question I  
7 have is how are we set to deal with the homeowner  
8 who has a PV system on his roof; ten years down  
9 the line he finds out -- well, in fact, he may not  
10 find out for awhile, but he's got inverter  
11 problems because he doesn't really have a  
12 performance monitoring system to be able to see  
13 what he's got.

14 But at some point he finds out that he's  
15 got an inverter problem. He's got to put in a new  
16 inverter, and that new inverter's going to be  
17 \$1000 to \$1500. And he walks away from the  
18 system. And so you have one more system on a  
19 rooftop not operating.

20 And the question I have is how are we  
21 looking to making sure that this doesn't happen.  
22 The hot issues are very important for longevity,  
23 or host issues, I mean, are very important for  
24 longevity, and especially residential.

25 And the way I see it, it's kind of the

1 goal is 20 year life with affordable available  
2 maintenance. And how do we do this; qualified  
3 suppliers, installers, maintenance people. And  
4 I'm wondering possibly it goes beyond that, but  
5 some kind of a program.

6 When I think about this onsite  
7 verification program that was done, this is  
8 looking at systems that are two, three years old.  
9 But what happens? Could there be a similar system  
10 that would be out there at ten years, something  
11 like that, to help residential owners find out how  
12 their systems really are working. Anyway, I'm  
13 convinced that policy has to be structured to  
14 support long life of operation.

15 Another issue that we've seen -- I'm not  
16 going to go through all this efficiency stairstep,  
17 but one of the things that we've seen, and  
18 certainly the writers of this report on the onsite  
19 verification, is that people don't necessarily  
20 know how many kilowatts their system really is.  
21 Because if you start clear over here at standard  
22 test conditions at 100 percent, what they are  
23 actually getting in ac could be 20 to 40 percent  
24 lower than that.

25 And one of the findings of this report



1        was that a great number of the homeowners were  
2        disappointed as to what the power output of their  
3        system was. And it seems to me like there's a  
4        matter of education, there's a matter of making  
5        sure that the systems really are operating the way  
6        that they should.

7                Certainly, help in some areas like  
8        orientation and shading isn't even on this  
9        stairstep, and shading is a significant problem.  
10       These are things, again, that I think that  
11       incentives should encourage design and  
12       installation which enhances, and I'll put in here  
13       again, long-term annual ac output.

14               Last comment on photovoltaic. Tim Tutt  
15       had a bar graph of average costs for photovoltaic  
16       systems; and Ryan, my partner here, plotted all  
17       the CEC data. And then did a trend curve. So a  
18       question may be asked is the price going down and  
19       the trend curve says the price is going down.

20               But I challenge you to, you know, I can  
21       somewhat explain how come some of these numbers  
22       are way up there; I'm not sure I can explain how  
23       come any of the values are there. But they vary  
24       all over the place. They're coming down, but it  
25       takes a little bit of imagination to consider that

1       they're coming down.

2               Ryan, I'll let you move ahead and talk  
3       about Palmdale now.

4               MR. PLETKA: Thank you, Larry; I  
5       appreciate the opportunity to speak to all of you  
6       today. One of the things that Black & Veatch does  
7       as a company, really one of our strengths is  
8       energy. And we do work in all forms of power  
9       generation, including coal, gas and then all the  
10      different renewable energy sources.

11              And this work that we've done as the  
12      engineer for Palmdale Water District I'll present  
13      to you as an engineer's perspective. We don't  
14      represent the District, we've just been employed  
15      by them since 2001.

16              And it's really good in terms of the  
17      types of projects that we've done; they've not  
18      only been solar, but also a large onsite wind  
19      turbine project and a hydro project, which we  
20      weren't engineer for, but I have the information  
21      for that, also.

22              Palmdale is located on the edge of the  
23      Mojave Desert. It's kind of a commuter city for  
24      Los Angeles. They are a water district; they  
25      provide clean water to the City of Palmdale and

1 the Antelope Valley.

2 But during the power crisis of 2000/  
3 2001 they were really faced with not only rolling  
4 blackouts and the possibility that their critical  
5 deliver of water might be interrupted, but also  
6 price increases up to 30 percent over the previous  
7 rates.

8 So they really wanted to take some  
9 solutions into their own hands that they could  
10 maintain their reliability of their water system,  
11 but also insulate themselves from some of the  
12 price spikes due to fossil fuels. And then really  
13 come up with lower rates, not only for their  
14 electricity, but also to lower their water rates  
15 for their customers.

16 So, we've been helping them, as I said,  
17 since 2001 with some of the consulting engineering  
18 and project management aspects of these projects.  
19 And the District has been implementing numerous  
20 self-generation projects.

21 The first one is this solar photovoltaic  
22 project. It's a pretty typical system, I think.  
23 Probably one of the better sited in the state  
24 because of the solar insolation is so great in  
25 Palmdale. It's about a 30 kilowatt ac output

1 system with annual 22 percent capacity factor.

2 And it did take advantage of net  
3 metering and also the self-generation incentive  
4 program administered by CPUC. The local utility  
5 is Southern California Edison. And this project  
6 was bid, permitted and operational in less than  
7 one year. And it was really more like a six-month  
8 project.

9 The other project the District is  
10 working on is a hydroelectric project which,  
11 really, I don't think anybody else is really going  
12 to talk about today. But there are opportunities  
13 for distributed generation that's hydro; solar's  
14 really not the only DG option, but probably more  
15 limited.

16 This is a 244 kilowatt project. It's  
17 got about twice the annual capacity factor as a  
18 solar project. And this particular project, the  
19 District takes water from the California Aqueduct  
20 and it goes down about a 100-foot drop into a  
21 local reservoir. And so they're just kind of  
22 recovering that energy that's typically wasted.

23 In order to make the project economical,  
24 the District is having to build a new distribution  
25 line from the hydro site to one of their load

1        centers so that they can offset the higher priced  
2        retail rates of the load center. Were they to  
3        connect to Edison at the point of generation  
4        they'd only be getting about 3 cents per kilowatt  
5        hour for their power. But by offsetting the  
6        retail rates, which is really what distributed  
7        generation is all about in my mind, they're  
8        offsetting power that's about four times as  
9        valuable.

10                And this project will be done about  
11        midyear next year. And there's absolutely no  
12        incentives that have been utilized except saving,  
13        maybe save the -- I think they're exempt from some  
14        of the exit fees and charges like that.

15                And the final project that we've been  
16        helping the District with is a single large wind  
17        project, 950 kilowatt turbine. It'll be located  
18        on the edge of the city, so it's pretty much in  
19        kind of an urban environment. I've got some  
20        pictures to show you here in a minute. It'll be  
21        sited at the water treatment plant which is the  
22        District's largest load center. And it's a fairly  
23        moderate resource in Palmdale. It's probably  
24        better than the average site in the state, but a  
25        class three wind resource is really what we think

1 makes this project economical.

2 In terms of key incentives, this project  
3 also took advantage of the net metering. It will  
4 be, to our knowledge, the largest wind project in  
5 the state that's net metered. And they're also  
6 taking advantage of the self-generation incentive  
7 program which will result in about a \$1 million  
8 rebate from Southern California Edison.

9 One take-away about the wind project is  
10 that it's much more difficult to implement than  
11 solar PV. There was quite a bit of public  
12 opposition to the project. There were certainly  
13 people who were in favor of it and people opposed,  
14 also. Primarily for the viewshed impacts.

15 And also, the Water District is a  
16 separate entity from the City of Palmdale; and the  
17 City of Palmdale actually sued the Water District  
18 over the project and tried to stop the  
19 implementation.

20 A little bit more about the location of  
21 the wind project. This is a satellite photo from  
22 the area. In the center is Lake Palmdale.  
23 There's the California Aqueduct there. State  
24 route 14, Avenue S, Sierra Highway. There's a  
25 rail line along one side of the site. This is a

1 commuter parking lot. There is boat and RV  
2 storage next door. There's the water treatment  
3 plant. There's also a shooting range.

4 And in the middle of all this is the  
5 wind project. So even with the existing  
6 environment, which is not necessarily the pristine  
7 Sierra Nevadas or anything, the public was quite  
8 opposed to the wind project.

9 Some simulations of the project. If you  
10 can't see it, it's kind of here in the center next  
11 to this water tank. This is a simulated view.  
12 And so you can see that it's certainly in the  
13 viewshed of quite a few houses. This is another  
14 photo simulation taken from the front door step of  
15 the local newspaper.

16 And finally, this is the current status  
17 of the project. There's actually a website out  
18 there called palmdalecam.com where you can go and  
19 you can get live updates on this wind project as  
20 it's being built.

21 Some of the elements here. This is the  
22 first section of the bottom tower. This was last  
23 Thursday or Friday. The project's currently under  
24 construction. This is the bottom section of the  
25 tower. Here's the two other sections over here of

1       the tower, and the blade assembly is on the ground  
2       right now, these three blades right here. This  
3       will actually be the -- or the hub where the  
4       generator is stored.

5               So within a couple weeks we expect the  
6       turbine to be fully erected; and we'll probably  
7       have a dedication ceremony sometime early July.

8               Now, here's some financials and some  
9       more information on the project to kind of compare  
10      them in summary. Again, the size of the three  
11      projects is quite different. The solar PV is 30  
12      kilowatts, and the wind turbine is about 30 times  
13      as large, from a capacity standpoint. The hydro  
14      project is in between at 250 kilowatts.

15              Now, the total project cost, including  
16      all the equipment, consulting, engineering,  
17      permitting of the projects, the solar project is  
18      about \$300,000; the wind project, 30 times larger  
19      in capacity, is a little bit less than ten times  
20      larger in cost; and the hydro project is about a  
21      million dollars.

22              Both the wind and the solar project got  
23      money back through the self generation program, so  
24      that the total cost on a per-kilowatt basis, after  
25      installation and the rebates and everything, for



1 the solar project is about \$5500 per kilowatt; the  
2 wind project's about \$1000 per kilowatt; and the  
3 hydro project is about 4000.

4 And then, again, the annual generation,  
5 the capacity factors, interestingly enough the  
6 solar and the wind project are about the same.  
7 And the hydro project is about double the annual  
8 capacity factor.

9 The one other critical thing is the  
10 power value, and this is really, in this case, the  
11 rate that's being offset. The solar PV, you have  
12 a lot more flexibility in siting, so if you have a  
13 number of sites, like the District does, you can  
14 kind of choose your highest rate site and put it  
15 there, at least that's what you should do.

16 The wind turbine, they're actually the  
17 larger your load center; more typically that's  
18 usually your lower cost site, so instead of  
19 getting about 12 cents per kilowatt hour for the  
20 power, we're getting about 7 cents. Also, the  
21 timing of the installation didn't work out  
22 optimally for some of the net metering programs.

23 And the hydro is similar, about 12 cents  
24 a kilowatt hour.

25 So all these numbers kind of wrap up in

1 terms of the payback for the District, the solar  
2 project is going to be a little bit more than 20  
3 years. For the wind project we're looking at less  
4 than 10. And the hydro project is a little  
5 uncertain at this point, probably 10 to 14 years  
6 for that.

7 So a range of paybacks, all of which the  
8 District is -- meet their internal goals. You  
9 might appreciate that, as a water district, it's a  
10 little bit difficult for a water district that's  
11 required to deliver water to its customers to  
12 really evaluate the project payback, especially in  
13 energy projects. Because they have an obligation  
14 to serve.

15 Some of the other things that we're  
16 looking to do with the District -- well, first  
17 they need to complete the wind and the hydro  
18 projects, but the hydro project and the wind  
19 project are very near each other, and there's also  
20 other DG devices, including engine generators on  
21 that site. And there's a variety of different  
22 types of critical and not-so critical loads, so  
23 we're planning, or we hope to, tie all those loads  
24 and generating sources together to what's called a  
25 microgrid type arrangement. That would be

1 supported by a new energy storage technology based  
2 on ultra capacitors.

3 And this has been -- we've been given  
4 notice from the CEC that this will be a project  
5 funded through energy storage program, but  
6 currently the contract is under negotiation; the  
7 Water District is reviewing that at this time.

8 In summary, some of the lessons we've  
9 learned is that -- I actually live in Missouri. I  
10 do quite a bit of work out here in California. And  
11 comparatively speaking, California's just about  
12 the best place in the country to do distributed  
13 generation, especially renewable energy projects.  
14 The variety of incentives and net metering  
15 programs, and just the thought that the utilities  
16 have already had to go through, this isn't the  
17 first of a kind, makes it much much easier.

18 One thing, especially with the more  
19 complicated projects, like the wind project,  
20 really you need to have somebody who is actively  
21 coordinating every single aspect of the project  
22 with the utility. And to try to help keep the  
23 utility aligned with helping you. Because there's  
24 a number of different programs that now have been  
25 put upon the utilities for them to coordinate,

1       such as the self generation incentive, the net  
2       metering program, the interconnection; also any  
3       particular distribution system modifications.

4               And it's presumptuous to think that the  
5       utility is communicating among all these different  
6       people. So it becomes somewhat the burden of the  
7       applicant to make sure that people are talking to  
8       each other, basically.

9               And as I said, the economics of these  
10      different resources vary quite substantially from  
11      wind to solar. But one thing that is interesting  
12      with the wind resource, we're in a class three  
13      wind site, which is pretty moderate. And still  
14      the payback on that is twice as good as the solar  
15      project, so we would think that even going down to  
16      lower quality wind sites you would have good  
17      potential economics. But that doesn't mean you're  
18      going to have good projects, because the public,  
19      probably you're going to have opposition to any of  
20      these projects that are wind-related, I would  
21      think.

22              With that, that's all of our comments.  
23      If anybody has any specific questions, feel free  
24      to call us or take questions now, also, I guess.

25              MR. TUTT: Our next presentation is from

1 SMUD, from Stephen Frantz of the SMUD Zero Energy  
2 Home Program.

3 MR. FRANTZ: Thanks, Tim. I'm actually  
4 not from the Zero Energy Home program; I'm the  
5 Planner for Residential and Commercial Retrofit  
6 Programs. And I'm standing in today for my  
7 colleague, Mike Keese, who has sort of single  
8 handedly built our PV residential new construction  
9 program over the past three years. And we were  
10 asked to sort of summarize where we're going with  
11 that today, mainly because it seems to be the  
12 market that is of growing interest to state policy  
13 centers. And it's certainly the PV market that we  
14 think, within SMUD, is the most promising.

15 Now, Mike put a CD with some slides on  
16 my desk and took off to Washington, where I think  
17 he's sort of taking the pulse of national energy  
18 policy. Haven't talked to him since. I've looked  
19 through the slides; I think I understand most of  
20 them. But if this presentation sounds a little  
21 extemporaneous it's because it is.

22 Also I'm not going to even remotely  
23 follow the sequence on your hard copy, so if  
24 you're trying to follow along, the best thing you  
25 could do is start at the end. That's sort of

1       where we're going to start. I can't remember  
2       which slide.

3               Let me set the stage by kind of  
4       summarizing how PV looks to a utility planner. On  
5       the one hand you've got this incredible technology  
6       that takes the most diffuse form of energy, a  
7       basically infinite supply of free fuel, and  
8       converts it into the most concentrated form of  
9       energy our species uses. It does so with no  
10      emissions and no moving parts. It can be scaled  
11      to just match your level of capital outlay. And  
12      the community loves it. That's the pro.

13              The other side is that it costs three to  
14      four to five times more than electricity from  
15      other generation sources, which is not a good  
16      thing if you see your primary as keeping your  
17      rates low for your customers. It doesn't appear  
18      to be dispatchable to the traditional utility  
19      planner. And it's extremely intermittent.

20              So, that is kind of the stage that we  
21      walked out on when we started SMUD's programs  
22      about a decade ago. And SMUD, being a human  
23      institution, it had the usual propensity to  
24      polarize things, so that people that were for PV  
25      began to be characterized as these sort of blue-

1 sky delusionals for whom PV was the answer, what  
2 was the question. And the opposite camp were sort  
3 of these fossil-fuel Luddites who are selling out  
4 their grandchildren.

5 I'm exaggerating the point to make it,  
6 but the point I'm really trying to make, without  
7 humor, is that all of the perspectives, all of  
8 these various perspectives on solar are very valid  
9 ones from inside a utility. And they all have to  
10 be honored if you're going to achieve anything  
11 approaching a consensus within the company as to  
12 where you want to go with PV. And those  
13 dichotomies are still with us today.

14 Now, the angels, from my point of view  
15 in that last sort of dualism I presented, did hold  
16 sway for about ten years, and SMUD has managed to  
17 get about 8 megawatts of solar installed.  
18 Largely, I might say, due to the efforts of a man  
19 sitting in the front row over there, three chairs  
20 from the right, Don Osborn.

21 We put a couple of 1 megawatt systems up  
22 in the mid '80s, and then in the '90s got serious  
23 about trying to do a long-range strategy. First  
24 starting with sustained orderly development, we  
25 thought we could create a market if we could buy

1       enough volume to bring down price and create the  
2       markets to absorb that volume. And let those  
3       markets grow because the price would be declining.  
4       It was a noble effort, and it somewhat worked, but  
5       we just weren't big enough to really pull it off  
6       as fast as it needed to happen.

7               We tried to do it by building some  
8       utility-owned systems; and then it became clear  
9       that we had to start to leverage our customers'  
10      investment. And we started to think in terms of  
11      customer-owned systems. This created another  
12      wonderful polarity within the utility, in which  
13      the people that didn't like PV in the first place  
14      said, oh, this is great, you want us to invest in  
15      it; now we don't even own the energy source. And  
16      we're going to buy back its product at retail  
17      prices. That's wonderful, that's very good  
18      business.

19             Those things still go on today, but  
20      we've reached some kind of a set of principles --  
21      I was going to put this on the slides, but it  
22      didn't occur to me to do it until last night --  
23      the stakes we have in the ground at this point are  
24      four principles that have been espoused by our  
25      board of directors as sort of guidelines we're



1       going to use in future resource planning. I just  
2       want to read them to you.

3               One is that we're going to emphasize  
4       local and regional environmental benefits over  
5       global benefits in resource planning. That means  
6       that as we move towards increasing number of  
7       renewables, we're going to try to make them  
8       locally sited, not just buy green tags and call it  
9       a policy.

10              The second one is we're going to lower  
11       the cost to serve our customers by reducing per  
12       capita usage. Peak usage is our nemesis. It is  
13       the thing that drives our costs up; it's the thing  
14       that scares us every summer.

15              The focal point of our resource planning  
16       is to start to bring that under control. And that  
17       is one reason why residential new construction  
18       programs are particularly pertinent.

19              The third principle is to meet or exceed  
20       the statewide renewable portfolio standard  
21       reaching 10 percent of retail sales by 2006, and  
22       20 percent by 2011.

23              And then, finally, develop cost  
24       effective, clean distributed generation. As part  
25       of this policy the District shall continue to be a

1 leader in solar power. Now that sentence  
2 originally read, we will continue to be a national  
3 leader in solar power. And after some debate the  
4 word national was removed because they were  
5 worried that once again we would start to try to  
6 buy the farm. And people were worried about  
7 expense.

8 Right now I would say that our policy  
9 has been set by a budget constraint. We say about  
10 \$3.5 million a year is going to be spent on PV.  
11 Nobody thinks that's the right way to do a policy,  
12 and so we're going through strategic planning now  
13 to try to get some idea of where we're going in  
14 the long run, where our exit ramps are going to  
15 be, and what the best business models are to get  
16 there.

17 Okay. I think it might be time for a  
18 slide. And I'm about to enter into my usual  
19 hostile interactions with computers.

20 (Laughter.)

21 MR. FRANTZ: You know, I could actually  
22 use an assistant right now. I want to go to --  
23 I'm not going to try to do this, you'll just see  
24 me become a nervous wreck -- I want to go to slide  
25 18. Here it is, system load. Next one.

1 Beautiful.

2 Okay, let's zero in on that one board  
3 principle which is to keep costs down by reducing  
4 peak usage. The top blue line is our system load.  
5 The horizontal is mis-labeled, that should be  
6 hours of the day obviously, not megawatts.

7 But, you see --

8 (Laughter.)

9 MR. FRANTZ: These are the projections  
10 for our PV department for what they want to do  
11 next year.

12 So you see how new home load really  
13 drives system load on a typical July day.  
14 Residential new construction is the single  
15 greatest contributor to our growth in peak load.  
16 And if we could start to radically change the way  
17 a new home behaves in terms of its load curve, our  
18 future would look a lot different in terms of what  
19 we can afford, and what mix of resources we could  
20 use.

21 Let's see now, I'm going to talk to you  
22 in a minute about the three new construction  
23 projects we've done, but I'm going to go first to  
24 showing you a result from, an actual field result  
25 from one of those projects. Let's see, I think

1       it's the -- yeah, the next slide.

2               Okay. You've got a typical new house,  
3       pink. You've got PV output, the yellow slope on  
4       the bottom. And you can see by subtracting it  
5       from the top pink one what it does to the house's  
6       load over the course of a day. So that, at say  
7       roughly 4:00, we're talking about maybe a kilowatt  
8       and a half less demand from that house than it  
9       would normally have.

10              There's no way, and I'm not by any means  
11       comparing energy efficiency measures to solar,  
12       because I realize that's its own politics, but  
13       there's no way at this point with the energy  
14       efficiency programs that we could put together a  
15       series of incremental measures that would do that  
16       for us so quickly and so reliably as we can do it  
17       with a PV system up there. There's just no way to  
18       get that quick drop. And that's why we're pretty  
19       interested in PV as a feature of new homes.

20              Let's look at some of the projects now.  
21       I don't know which one this came from. We've done  
22       a project with Beazer, with Morrison and now with  
23       Premiere Homes. I suspect this is from one of our  
24       Beazer homes. So let's go back to slide 6. You  
25       know, I think I could probably manage those little

1 buttons. Thank you so much; it's nice to be able  
2 to observe you.

3 Okay, this is just a little selection of  
4 the way various roof-integrated products have  
5 looked. Starting from top left, with things that  
6 builders decide they aren't going to use, which is  
7 free-standing or not integrated with the roof.

8 The next two on top are the early  
9 Atlanta sun slates, which was our sort of maiden  
10 voyage with building integrated. It was an okay  
11 product; little difficult to install; and we're  
12 not using it any longer. The bottom two are  
13 AstroPower products.

14 Every solar manufacturer that's in this  
15 market realizes that there are tremendous bugs to  
16 be worked out in terms of being able to install a  
17 system, for a standard roofer to be able to  
18 install these systems with the same ease that they  
19 install a roof. And until they get there, there's  
20 going to be resistance among the builders.

21 Our first project was with Beazer. In  
22 December 2000 I was working with Mike Keesee on  
23 residential new construction, where do we go next.  
24 I think Keesee said let's do a zero energy home.  
25 I said okay. So we started to find some builders

1       who wanted to play ball. And we worked with about  
2       eight or nine of them.

3               Beazer was really the first builder that  
4       stepped up to the plate, and they built the so-  
5       called Beazer power house, the first of its kind.  
6       They sold 18 of them. And here's what occupants  
7       of Beazer power houses, this is how they affected  
8       their energy usage with the PV. I'm going to stop  
9       a minute and just let you absorb that for a  
10      second.

11             Sure, in all cases their total kilowatt  
12      consumption is the white column. That's what the  
13      house used. The PV consumption is the maroon  
14      column. And the net, subtracting the PV from the  
15      white, is the blue.

16             So I think only in two cases did the  
17      occupant actually end up using more electricity  
18      than their PV system produced. Most of them were  
19      net energy producers.

20             Now, interestingly, and we'll talk about  
21      this a little more further on, interestingly most  
22      of them who were net energy producers thought they  
23      were getting a good deal. However, their interest  
24      payments in financing the system, most of them  
25      were in a negative cash flow position. Even

1       though their energy consumption had been  
2       compensated for, they were still paying more to  
3       own their system than they were gaining by the  
4       energy they were saving. This didn't bother them.  
5       That's a very interesting psychological fact.  
6       That is not how they looked at the value  
7       proposition. They looked at how it affected their  
8       energy bills. They did not look at the fact that  
9       they were shelling out \$40 to \$50 more per month  
10      to have this.

11               What's that say about this market? It  
12      probably says that you're in an early adoptive  
13      stage in which they don't care. Or you can say  
14      that once people make a purchase they become  
15      oblivious to its effects. It's not a slap against  
16      SUV owners, either.

17               (Laughter.)

18               MR. FRANTZ: All right. Our next sort  
19      of builder champion was Morrison. They used an  
20      AstroPower product. A little easier to install.  
21      The roofers have an easier time with it. I'm  
22      going to show you -- I don't know how meaningful  
23      this next slide is, but I'm going to put it up,  
24      anyway.

25               This kind of tells you how much SMUD put

1 up for this whole thing, and that's probably not  
2 as interesting as the -- the important thing about  
3 this one is the installed cost was about 875.  
4 That's pretty typical for new construction.  
5 You're going to look between 8 and 9 bucks a watt.  
6 And we've been putting up about half of that. The  
7 builder's been willing to put up about half of  
8 that. And at that cost they feel they can mark up  
9 a system enough to make some dough on it, and  
10 still not have it be so expensive that it'll  
11 dissuade the homeowner from buying the PV equipped  
12 home.

13 Here's some of the features that were in  
14 that so-called zero energy home. It not only had  
15 the PV, but we did vinyl, you know, very high  
16 performance windows; high FUE furnaces; 14 SEER  
17 air conditioner; tankless water heating, that  
18 really doesn't have anything to do with  
19 electricity use, but there was this whole  
20 collaboration with PG&E and federal funding and so  
21 forth that we wanted to minimize both electricity  
22 and gas.

23 And the most important thing is what was  
24 going on with the ac. Because once again, it's  
25 cooling load we're trying to knock down here. So



1       you put in a very high SEER air conditioner; you  
2       design the duct distribution system very well; and  
3       try to compensate for its use with the PV.

4               For the techies in the crowd, this is  
5       the system. We're now calling it GE Energy  
6       because they bought AstroPower.

7               And this is our final, this is the  
8       people that most currently have begun to do zero  
9       energy home, Premiere Gardens. They're going to  
10      do 50 homes. I don't know how many Morrison has  
11      sold. I wish I had that figure for you, but I'm  
12      not updated on it. But Premiere has committed to  
13      building 50, I think.

14              All right, so those are the projects  
15      that produced a load curve similar to the one you  
16      saw earlier.

17              Let's scroll down here a little bit.  
18      Okay, obviously peak shaving we see as the biggest  
19      single advantage of this. We're looking at  
20      whether the energy production you sacrifice by  
21      doing a west-facing system would be more than  
22      compensated for by the money you'd save by being  
23      able to knock down peak further. And to not buy  
24      as much electricity at peak times.

25              The most important sentence in this

1 whole slide, or the most important four words are  
2 at the very bottom where it says, with large  
3 enough penetration. PV is sort of like  
4 carpooling. If everybody did it, it could make a  
5 huge difference. If only a few people do it, it's  
6 pretty insignificant.

7 The real question with residential new  
8 construction is how to get high volumes, and to  
9 really make it marketable so it starts to be an  
10 ever-growing percentage of new homes built.

11 Now, what does that mean for marketing?  
12 I mean one way you can do it is through mandate.  
13 But let's back away from that a bit and just say,  
14 what do we know about how these things can be  
15 marketed. Beazer tried to do it as an option.  
16 They built the house. They're a low-cost builder  
17 anyway. And then they said, if you want PV it's  
18 going to cost you this much extra. They sold 18  
19 homes. Not very many.

20 Oh, 18 out of how many that were  
21 equipped that way? It was a development of 250  
22 homes.

23 Shea Homes did it a different way, down  
24 in San Diego. They didn't offer it as an option.  
25 They put it as a standard part of the home. They

1        put them on lots of homes, expensive ones, I might  
2        add. People wanted to keep up with the Joneses,  
3        they didn't know what the cost of the PV was, they  
4        only knew what the cost of the home was.

5                    And did a little bit of market research  
6        on those customers and I wanted to read three of  
7        the comments to you. I realize this has no  
8        statistical value; it's a small sample. But it  
9        might indicate something about where the future of  
10       this market lies, or how marketing can be most  
11       effective.

12                   One customer: It's best to integrate  
13       the solar electric system into the entire home  
14       purchase, rather than having offered it as an  
15       option in a piecemeal way. It should all be  
16       rolled into the overall price."

17                   Another customer: We wanted to get the  
18       house because the system was already there. We  
19       didn't have to decide about it. We're glad it's  
20       there. We're lucky to have the PV." I doubt that  
21       that customer knows how much their system is  
22       producing, they're just glad to have it.

23                   Third customer: We feel the builders  
24       know what they are doing, so if they offer the  
25       solar as part of the package, there must be a

1 reason."

2 (Laughter.)

3 MR. FRANTZ: That's good stuff. That's  
4 good stuff. Because if we're going to get serious  
5 about the residential market, we probably don't  
6 want its future growth to rest in the hands of the  
7 individual homebuyer. It's too much for them to  
8 have to calculate and figure out to make a  
9 decision about. That's not the way to go. So we  
10 will see what happens with Premiere Homes in terms  
11 of how they market it.

12 Let's see, do I have anything more to  
13 tell you today? I don't think so. I think  
14 that'll do. You sort of get the point. We are  
15 really interested in zero energy homes, and I  
16 would say that's where we're going to put an  
17 increasing amount of whatever budget we manage to  
18 wrest from the utility planners for PV.

19 Thanks a lot.

20 (Applause.)

21 MR. TUTT: Next we're going to hear from  
22 Steve Heckeroth, a long-time solar industry  
23 person; and he's coming to us from Albion,  
24 California.

25 MR. HECKEROTH: Actually I appreciate

1       being here very much. I've been -- in 1970 I  
2       found myself organizing the first Earth Day at  
3       Arizona State University where I was studying  
4       architecture. And I learned that we were just  
5       reaching the peak of oil production -- actually  
6       oil extraction, we don't produce the stuff -- in  
7       this country.

8               And it gave me a certain sense of  
9       urgency that I should do something. Because we're  
10      totally dependent on fossil fuels for all our  
11      energy. So from that day on I treated that as a  
12      life-threatening situation for me and my family.  
13      And I've been working to find alternatives ever  
14      since then.

15             I currently work with Solar Integrated  
16      Technologies and with UniSolar. And I'm here at  
17      the request of Stan Ovshinsky, the inventor of  
18      thin film amorphous panels and also the nickel  
19      metal hydride battery, and about 200 other patents  
20      that he has.

21             I was very pleasantly pleased and  
22      surprised to find that I have tremendous allies in  
23      my search for alternatives, not the least of which  
24      is our Governor. He has made many pledges in his  
25      run for governor, and these are a few of them.

1 And the most important thing that I think that he  
2 is letting everybody know in bringing solar  
3 mainstream is that economic growth and the  
4 environment can coexist.

5 He suggested that by 2005 50 percent of  
6 new housing developments would install solar PV.  
7 And as Tim mentioned, in Japan there's 70,000 PV  
8 roofs already in existence. And in Germany I  
9 heard in a recent presentation that there is  
10 already 500 megawatts installed.

11 So if a country like Germany that has  
12 about less than half the solar resource that we  
13 have can do it, we should certainly be able to do  
14 it here.

15 On the left there is a 6 kilowatt  
16 installation in California; it's in Oakland on a  
17 co-housing project.

18 The Governor also suggested that we  
19 derive 33 percent of our state's power from  
20 renewables by 2020. That's a pretty grandiose  
21 goal and I hope we can all realize the sense of  
22 urgency to get there.

23 There's a company called Solar  
24 Integrated Technologies in Los Angeles that is  
25 working very hard to achieve that goal. And this

1 is one of their installations. It's a 230  
2 kilowatt building integrated installation at a  
3 Coca-Cola bottling facility.

4 Why renewables? These are all very  
5 recent books that I've gathered. And I think  
6 finally the sense of urgency is becoming  
7 mainstream. The last National Geographic, I  
8 think, has done that for us.

9 I also found out that the peak of  
10 natural gas production in this country was also in  
11 1970. And now we are relying on huge amounts from  
12 other unstable areas in the world, and talking  
13 about shipping it across the world, around the  
14 world, a very dangerous situation in the current,  
15 susceptible to terrorism and everything. And we  
16 do rely so much on natural gas in this state,  
17 particularly.

18 The last little book is one that I'd  
19 really like to give everybody. It's a guy who  
20 just stumbled across the situation that he saw we  
21 were getting ourselves into a few years ago. And  
22 he wrote it all down in a book and he came up with  
23 the answer. And the answer for him was that  
24 everybody should have a photovoltaic roof on their  
25 house. And that could supply, according to his

1        calculations, about 10 percent of the energy that  
2        we currently use. Which means that we have to  
3        become a whole lot more efficient to live off  
4        solar energy.

5                    And this is just the current source of  
6        energy based on scarcity. And taking billions of  
7        years to create. And we're using it up in  
8        hundreds of years. And the abundance of the sun,  
9        which is going to burn for another 5.5 billion  
10       years.

11                   The chart on the right shows the peak of  
12       oil production, but there's a similar chart for  
13       natural gas. The lower lines show the peak in the  
14       U.S., how we've become more and more dependent on  
15       imports. And that line is going up at 4 percent a  
16       year, and our production is going down at 2  
17       percent a year. And California is like the Middle  
18       East of solar power.

19                   So we have choices to make. And why  
20       should we go to distributed generation? Because  
21       these are some of the reasons.

22                   Centralized power generation. I was  
23       here in this room about two months ago. I wanted  
24       to give this same presentation, but it was all the  
25       utilities here. And they weren't willing to talk



1       very much about distributed generation. Because  
2       we have this paradigm now where centralized can  
3       solve our problems.

4               But you can see what it takes to put  
5       even a centralized PV installation and the  
6       problems that you run into, compared to  
7       distributed power generation where it requires no  
8       added land. We used to say that if you found so  
9       many square miles of land in the desert you could  
10      satisfy the electric needs by putting in PV. But,  
11      you'd have to distribute that power.

12             But we actually have enough roofs to  
13      supply most of our needs. If we put PV on all our  
14      roofs, if we can get the cost down low enough we  
15      can put PV on all our roofs and satisfy our  
16      electric needs without very much load on the  
17      distribution lines at all. We don't have to  
18      increase that load.

19             And we can also shave our peaks,  
20      because, as was just pointed out, the peak of  
21      solar production equals the peak of air  
22      conditioners coming on. And also water pumping.

23             So, if we can shave peaks and the power  
24      is also valued at the retail rate, which is not  
25      very good for the utilities, but it's certainly

1 good for the people who want to install PV.

2 I wanted to mention something about  
3 BIPV, since that's what I've been focusing on for  
4 the last three or four years. And I did obtain,  
5 through the PIER program, which Joe McCabe was  
6 organizing at that time, a grant to develop a BIPV  
7 product.

8 And currently I think we are depending  
9 on our aesthetics for historical reasons. We used  
10 to, the only thing available for roofing was  
11 shingles or tiles. So we had very small units.  
12 And so when we look at a shingled roof we think  
13 that is what is aesthetically pleasing. But now  
14 we've come up with large area materials that can  
15 cover a roof more efficiently and more quickly.  
16 So why can't we have some kind of a paradigm shift  
17 to a new aesthetic based on efficiency, rather  
18 than an old aesthetic based on small pieces of  
19 wood and tile.

20 And then we could move very quickly to  
21 lower the cost of photovoltaics and make it truly  
22 building integrated roofing. But before we put on  
23 PV, we have to redesign our whole land use  
24 planning infrastructure. We have to plan for  
25 energy efficiency. We have to orient the

1 buildings in the right direction. And we have to  
2 make them as efficient as possible, and use every  
3 conservation measure available to us.

4 In '94 was when the CEC did this  
5 wonderful document called Energy Aware. And it  
6 outlines all the strategies for making planning  
7 based on energy efficiency. These documents  
8 already exist. It's a very good, thick, well-  
9 written document that if we had used it to do all  
10 our planning from '94 on, we would be in such  
11 great shape right now.

12 And they followed that document two  
13 years later with the Energy Yardstick, Places,  
14 Planning for Community Energy, Economic,  
15 Environmental Sustainability. And it used energy  
16 as a yardstick to inform us how we should lay out  
17 our communities.

18 Now, before we had cars, if we look at  
19 the European models, they knew that there had to  
20 be a greenbelt around towns because they had to  
21 grow the food close enough to the town in order  
22 that we didn't have to spend so much energy  
23 shipping it around the world. So they had  
24 greenbelts where the farmland was.

25 And the towns were designed so you could

1 walk across them in half an hour. And that was  
2 the parameter that they had for community  
3 planning.

4 And I think that if we took those ideas  
5 before cars, because that's where we're headed,  
6 back when the fuel runs out we are going to have  
7 to come up with alternatives. And the best  
8 alternative is one that allows us to use our  
9 bodies to get around, and maintains our health at  
10 the same time.

11 This kind of planning has gotten a lot  
12 easier with GPS and GIS. Back when McCarg wrote,  
13 *Designed With Nature*, which is another book I'd  
14 really recommend, where he looks at all the  
15 determinants, hydrology, solar access, everything  
16 that's available to look at before you do  
17 planning. That kind of a overlay of determinants  
18 is so easy with GPS and GIS now that it should be  
19 done in every planning department in the country.

20 And when we talk about coordinating  
21 state and local agencies that's what we should be  
22 doing, is coordinating planning and development so  
23 that it takes into account how much energy input  
24 there is into communities.

25 You have to know where the sun is before

1       you can use its energy. The simple sun chart  
2       should be what is used by every architect, by  
3       every planner in order to lay out communities and  
4       design homes. In the summer the sun is at 73  
5       degrees above the horizon in this latitude. In  
6       the winter it's only 27 degrees above the horizon  
7       in this latitude.

8               Just knowing those simple facts you can  
9       design an overhang on the south side of a house to  
10      totally exclude the sun's heat in the summertime;  
11      and let the sun's heat fully into the space in the  
12      wintertime. And that can do more to save energy  
13      than any amount of PV we can put on a roof.

14             Solar water heating, we have to learn  
15      from our -- I've been in this business for long  
16      enough that I went through at least two solar  
17      bubbles in the past. The first one was in the  
18      early '70s when we had the gas crisis; and the  
19      back-to-the-land movement happened; and people  
20      were learning very quickly about solar design.

21             And the second one was the water  
22      heating, solar water heating incentive programs,  
23      which were an utter failure. Because they were  
24      front-end incentives. And that's the lesson we  
25      have to learn from that failure. When you front-

1 end, when you put the incentives on the front end  
2 there's no performance criteria for judging the  
3 success of your incentive program.

4 I've got 200 perfectly Revere solar  
5 collectors in my barn that I got off a building in  
6 Palo Alto, a city building. Those solar  
7 collectors, when they were new, were \$500 apiece.  
8 They put them up, they got their rebate, they put  
9 them together with rubber hoses that failed in two  
10 years. And they leaked, and they were up on that  
11 roof for 15 years as an example of why solar  
12 doesn't work. Because of a front-end incentive  
13 that didn't have any performance base.

14 And that's the same kind of incentive  
15 we've started with PVs. So that's why I would  
16 really encourage a look at the German model, which  
17 is performance based. Those thermal collectors  
18 are still good today; I've been reselling them to  
19 people and giving them away to people to put in  
20 solar water heating systems on their homes.

21 I've used solar water heating for 30  
22 years on a system that cost me \$250 to put in. I  
23 got a \$750 rebate to put it in. It's been  
24 working, satisfying all our hot water needs for  
25 about nine months out of the year without any

1 pumps. It's a thermal siphon system. Without any  
2 energy addition.

3 Now, that would have cost us at least  
4 \$50 a month in electricity usage for those 30  
5 years. I haven't figured that out, but it's a lot  
6 of money that I've saved with that \$250  
7 investment.

8 Solar water heating is about three to  
9 five times as efficient as PV. So we have to do  
10 the things that make sense first, and then PV is  
11 the frosting on the cake that gives the --  
12 satisfies the needs for electricity that can be  
13 met no other way.

14 As I said, renewables incentives should  
15 be performance based. If we had put all the money  
16 that we put in the front-end incentives in a  
17 revolving loan program we would still be reaping  
18 the rewards of that money. But, as it is, until  
19 we get into a revolving loan, a renewable  
20 revolving loan, we are just going to put that  
21 money out there, one-time expense, and we don't  
22 know how the systems are performing because we've  
23 already paid for them.

24 The German model is based on performance  
25 because they put the incentive in the tariff.

1       They have a solar tariff that pays 53 cents per  
2       kilowatt hour for ground-mount systems, and 64  
3       cents a kilowatt hour for building-integrated  
4       systems. That means that it's paid back, the loan  
5       payment would be paid back out of the money  
6       generated from the performance of the system. So  
7       it's an automatic payback if your system is  
8       functioning, and you make sure your system is  
9       functioning if that's the way you incentivize  
10      renewables.

11                   And I think that's it. Thanks very  
12      much.

13                   (Applause.)

14                   MR. TUTT: Thank you, Steve. Next we  
15      hear from at least a company that's relatively new  
16      to the solar industry, Dave Nyberg from General  
17      Electric.

18                   MR. NYBERG: Good morning,  
19      Commissioners; thank you for the opportunity to  
20      present here. My name is Dave Nyberg. I am from  
21      the General Electric Company. Myself and my  
22      colleagues in the back, Chris Molello and Scott  
23      Reynolds appreciate the opportunity to present  
24      here and make some of our views known.

25                   General Electric is a very large company



1       made up of 11 divisions. It's interesting, I  
2       didn't know until I started working for GE that  
3       NBC is owned by General Electric. Kind of  
4       interesting tidbit there.

5               The division we work for is called GE  
6       Energy. And GE Energy is one of the largest  
7       divisions at GE that makes reliable efficient  
8       products and services for the energy industry.

9               It's an interesting factoid that about  
10      more than 50 percent of all of the electricity  
11      generated every day around the world is generated  
12      using GE Energy products. And I think that's kind  
13      of a neat thing.

14              GE Energy realized that part of their  
15      energy portfolio that was missing was PV  
16      technology. And GE has been researching, getting  
17      into the PV business for about the last three  
18      years. And they've interviewed and examined and  
19      looked at basically every PV company and  
20      manufacturer in the world to try and figure out  
21      how to get into the PV business.

22              And the decision they made was to  
23      purchase a company called AstroPower. And about  
24      nine weeks ago General Electric purchased most of  
25      the North American assets of AstroPower, who some

1 of you may be familiar with. And along with that,  
2 the entire North American sales staff and  
3 marketing staff. So they were already up and  
4 running in the PV industry, so to speak, right out  
5 of the chute.

6 The reason that GE's timing is now is  
7 because our CEO of our division, John Rice,  
8 believes that the time is now for commercially  
9 viable solar product. We're not in this for a  
10 science project, he says. And we fully believe  
11 that we're going to be in this long term and it's  
12 going to work very well for GE. It fits very well  
13 into our portfolio and we expect it to work very  
14 well.

15 From a marketplace that we're interested  
16 in competing in, we expect that in the long term  
17 the PV marketplace will not rely on subsidies.  
18 And we're planning for that. Of course, in the  
19 near term, and the reason we're here today is to  
20 talk about incentive programs to tie us over to  
21 when that can happen.

22 PV marketplace also, we believe, should  
23 have minimal obstacles for somebody who wants to  
24 get PV onto the roof. It needs to be easy to  
25 install; it needs to be inexpensive; all of the

1 key things that we already know.

2 The marketplace that we'd like to  
3 compete in has sufficient demand, lots of product  
4 volume, lots of learning experiences, lots of  
5 things happening for all of us to drive the costs  
6 down. And, of course, a competitive marketplace  
7 where there are big players to continue to keep  
8 ourselves in the industry honest, so that the end  
9 users of the products we develop continue to get  
10 good value. And that is, we believe, very  
11 important.

12 GE is a very analytical company; very  
13 process driven; and has grown to be one of the  
14 largest corporations in the world because of that.  
15 And the way we've chosen to do our presentation  
16 today, rather than talk about our experience in  
17 the builder market and some of the other things  
18 that we've done in the solar industry, and I think  
19 some of those may come out in the roundtable  
20 later, we've chosen to simply go through and  
21 address the questions that were published in  
22 attachment B.

23 And so this is going to be essentially  
24 the questions and an answer for each one, where we  
25 feel we can answer them. It's obvious the

1        questions that we don't feel we can answer, and  
2        we'll just move right through those. So, if you  
3        have that sheet with you, you can look at it, or  
4        you can just follow along here.

5                    How should the programs be coordinated.  
6        I've abbreviated some of these questions, too, by  
7        the way, from their actual form, so they're  
8        slightly different. How should the state and  
9        local programs be coordinated; how formal or  
10       informal should they be.

11                   Our basic premise is that we need to  
12       have an incentive program that's simple, long-  
13       term, consistent and reliable that all the  
14       stakeholders involved can plan for, the  
15       manufacturers, the utilities, the builders, the  
16       consumers, everybody understands what to expect.  
17       And to pull off a program like that we'll need  
18       some kind of coordination. Exactly what that  
19       looks like or what it will look like, we're not  
20       sure yet. But as we mature in our process in the  
21       marketplace, we may be able to make some policy  
22       recommendations in the future.

23                   Are we achieving the program goals of  
24       bringing about the cost reductions so that we  
25       don't need incentives anymore. We met with Tim

1       and the gang at the gang at the CEC, John here, a  
2       week and a half ago, and discussed our plans.  
3       We've actually hired some resources recently to  
4       delve into the data and we're expecting to provide  
5       those results to the CEC in the coming weeks.

6               What's the expected outlook in cost  
7       reductions for the retail purchase of distributed  
8       generation systems. Obviously we plan on costs  
9       going down. The specific details of those, of  
10      course, are proprietary and we wouldn't discuss  
11      those here in this forum.

12             What can be done to accelerate cost  
13      reducing this technology. Research is really what  
14      it takes; the research and experience installing;  
15      a marketplace where we can install lots and lots  
16      of systems and learn from those installations is  
17      important. Programs like the PIER program that  
18      we're involved with here at the CEC and have been  
19      in the past in our AstroPower days obviously  
20      helped drive the cost down with the research.

21             If funding is necessary while costs are  
22      declining, how much do we need, how long, where  
23      are the dollars going to come from. As I  
24      mentioned, we're in the process of developing our  
25      recommendations and we'll be sharing those with

1 the CEC in the next few weeks.

2 GE is in both the PV and the small wind  
3 industry. What happens if the incentives go away.  
4 Well, we expect them to go away, that's part of  
5 our business plan. And part of our plan is to  
6 continue to be successful in these businesses  
7 worldwide, as the incentives fade out.

8 What should a new incentive program look  
9 like, the million-dollar question, so to speak.  
10 Is it performance based, is it an upfront rebate,  
11 is it a streamlined entitlement process, kind of a  
12 carrot to hang out for the new builder community;  
13 some hybrid of these, you know, these different  
14 kinds of programs. We're not really sure, yet,  
15 what form it should take. We haven't really  
16 wrapped our arms around it and decided, as a  
17 company, what we're going to sort of endorse as  
18 the official plan that we'd like to see happen.

19 But what we do know, going back to the  
20 first slide, is it needs to be a simple, long-  
21 term, consistent, reliable program that drives  
22 demand and cost reduction and something that  
23 everybody can plan for.

24 What lessons can we learn from other  
25 countries. We saw those neat slides and the

1       wonderful results from Germany and Japan. The  
2       bottomline on why those programs have been  
3       successful is that folks can plan for them; they  
4       understand the economic impact of them; and that's  
5       why they can be successful.

6               Should the state revisit existing  
7       support policies for these types of programs, a  
8       cap on metering and those kinds of things.  
9       Absolutely. Whatever policy that exists it should  
10      be supportive of the new incentive programs that  
11      we come up with as an industry to help drive this  
12      as we move forward.

13             Should the state establish a program to  
14      get PV in new homes. Yes. An incentive program.  
15      We think that's important, in the short term.  
16      Long term, of course, we don't believe that's  
17      necessary.

18             What should the near- and long-term  
19      goals be for PV in new homes. Should the state  
20      establish targets. Private industry is driven by  
21      goals and targets. Every sales guy on the planet  
22      has a target and a goal. They're very important  
23      for getting people motivated and excited about  
24      making things happen. The million solar roofs,  
25      for instance, has a target of a million solar

1        roofs, or, you know, something like that. We need  
2        to put numbers out there, they make great sense.  
3        But to get there we need to develop the programs  
4        to support the people in the industry to make that  
5        happen.

6                Should mandates, incentives or other  
7        strategies be used. We are opposed to mandating  
8        PV on new homes or in new home construction. And  
9        we should look at all other opportunities,  
10       different kinds of programs to help motivate the  
11       industry.

12               Opportunities, barriers to more PV in  
13       the new home market. A simple, long-term,  
14       consistent program is something that we believe is  
15       really important. From a product perspective, the  
16       building integrated products that GE now offers  
17       that were developed by AstroPower are being very  
18       well accepted by the new home builder community.

19               We've seen explosive growth in our flat  
20       cement tile integrated product. We've had great  
21       success working with SMUD on two different  
22       projects with them where we've used that product.  
23       Down south it's been extremely successful at  
24       Ladera Ranch, driving a large percentage of our  
25       new home building market, because it's an



1 aesthetically pleasing product, which is  
2 important.

3 So we think that the timing is right;  
4 the products are here; we just need to have the  
5 right programs to help us get this rolled out.

6 Should we modify building codes to  
7 require new buildings to be solar ready. New  
8 buildings I took to mean new residential homes,  
9 single family homes. No. We believe that the  
10 additional time and money will actually drive the  
11 cost of housing up. And there's another question  
12 a little bit later that addresses that a little  
13 more fully.

14 Should PV on new homes be mandated. No.

15 What are the consequences if we did  
16 mandate PV on new homes. Well, the four main ones  
17 that we can think of, and there are probably more,  
18 the builders are not going to be very excited  
19 about this and they're going to push back pretty  
20 hard, as Bernadette notes.

21 California housing costs are already too  
22 high, and we don't want these costs to be passed  
23 on directly to the homeowner. We want to find a  
24 way that the builder can benefit from installing  
25 the PV and make it part of their housing package.

1                   Another consequence, PV is a very site-  
2                   specific technology. If you're building in the  
3                   foothills or anywhere where there's hills around,  
4                   or even two-story homes in a community, you can  
5                   have serious problems with shading, orientation;  
6                   and it just may not work on that house. That  
7                   actually happens.

8                   And the last reason we think that we're  
9                   not ready for a mandate is because the PV industry  
10                  isn't mature enough yet. The programs to deliver  
11                  large quantities of systems to new home builders  
12                  with the right products, the right installers, the  
13                  right marketing training, sales training, support,  
14                  service, installation, I mean there's a very long  
15                  list of things that AstroPower, and now GE, has  
16                  done very well to become the leading player in the  
17                  new home builder market, but even we realize we're  
18                  not ready to roll this out on a massive scale.

19                 We're certainly ready for growth and  
20                 headed in that direction. And depending on how,  
21                 you know, this works out, we'll definitely be, and  
22                 plan to be part of the industry for a long time.

23                 Under what circumstances should a PV  
24                 system qualify for compliance credits. If a  
25                 system's making electricity it should get credits.

1       How those credits are used and where they're  
2       applied, who's the recipient, who gets the benefit  
3       of them, they need to be thought of in terms of  
4       this total incentive package that we're rolling  
5       out and making sure that the right stakeholders  
6       are the benefactors of these credits, and the  
7       benefits that these credits bring.

8               What role can the IOUs and the munis  
9       play in getting PV in new homes in their service  
10      areas. The utilities, as stakeholders and  
11      beneficiaries of the PV, need to be fully invested  
12      in the success of this program as it rolls out.  
13      SMUD's a shining example of a company that's  
14      willing to put time, money, I mean full resources,  
15      both people and money, into these programs, and  
16      have done three very successful programs. And our  
17      plans for next year with them are to do more.  
18      SMUD's a great example of how that can work.

19             What role can the builders play in  
20      delivering PV on new homes. As the leading  
21      supplier of PV to the new home market we have  
22      excellent relationships that we've crafted with  
23      most of the large home builders in the United  
24      States, specifically the ones that build here in  
25      California.

1                   And we'd love to help organize a forum  
2           where we can bring together the builders, the  
3           finance people from these builders, the  
4           presidents, the marketing people, all of the key  
5           stakeholders in the builder community to help, in  
6           a forum -- maybe it's one like this, or maybe a  
7           smaller one -- where we get together and ask  
8           builders, you know, what is really going to help  
9           you and drive you putting PV on every single home  
10          that you build. Because that's really what we'd  
11          like to see. The builders can help us a ton  
12          telling us what they'd really like to see.

13                   Should the builder program be  
14          coordinated with new and existing incentive  
15          programs, if at all. Where it makes sense to do  
16          that, where we can have economies of scale  
17          processing applications, and there's certainly a  
18          lot of things that we can share with the retrofit  
19          market. We are definitely different than the  
20          retrofit market, and we believe a lot of the  
21          processes that are involved in the new home  
22          builder community can be greatly streamlined with  
23          a master purchase agreement and things like that,  
24          that we've already helped get into use. So, where  
25          they can be coordinated they should be, because we

1 think it makes good sense.

2 Thank you very much for your time. I  
3 appreciate it. During the roundtable, during the  
4 breaks, afterwards, if you have questions you'd  
5 like to ask myself or Chris or Scott, please feel  
6 free to -- if you guys want to wave so they know  
7 who you are -- please feel free to pin us down and  
8 we'll be happy to chat.

9 Thank you very much.

10 PRESIDING MEMBER GEESMAN: Thanks, Dave.  
11 Sheryl Carter from NRDC had a schedule conflict,  
12 so maybe we can take her -- she's shaking her  
13 head.

14 MS. CARTER: I did not have a schedule  
15 conflict.

16 PRESIDING MEMBER GEESMAN: You lied on  
17 your blue card?

18 (Laughter.)

19 MS. CARTER: I did?

20 PRESIDING MEMBER GEESMAN: I'm sorry, I  
21 shouldn't attribute that to you. Somebody wrote  
22 on your card, in different colored ink, special  
23 request to speak before noon.

24 MS. CARTER: Could we have a handwriting  
25 analysis --

1 (Laughter.)

2 MS. CARTER: Actually I don't know who  
3 made that request. I didn't. I don't want to  
4 stand in the way of --

5 PRESIDING MEMBER GEESMAN: Okay.

6 MS. CARTER: We have a hand.

7 UNIDENTIFIED SPEAKER: I think that was  
8 me.

9 MS. CARTER: I would be happy to wait  
10 until --

11 PRESIDING MEMBER GEESMAN: Okay, great.

12 MR. TUTT: I'm sorry, hang on just a  
13 second; there was a special request for someone to  
14 speak before noon.

15 MR. SHELDON: Hello, thank you for  
16 allowing me to break into the schedule. I have  
17 another meeting with PIER and SMUD here in a few  
18 hours.

19 My name is Kent Sheldon. I'm with SMA  
20 America. I do not have a presentation. And I  
21 wanted to talk today about inverter efficiencies  
22 and how those are used with the CEC emerging  
23 renewable program rebate.

24 There's recently been a lot of  
25 discussions about this one point. Myself, SMA,

1       and Ballard had a meeting with some CEC Staff  
2       members last week to discuss the same issue.

3               An inverter is basically a device that  
4       takes dc power from solar arrays and converts that  
5       to ac power. In doing so that consumes some of  
6       the electricity. And, hence, you have an input  
7       power versus output power, or an efficiency  
8       number.

9               The CEC rebate uses that number to  
10       determine one of the determining factors in the  
11       amount of rebate that a customer gets, based upon  
12       the total cost of the system. Basically you take  
13       the rebate amount and multiply it times the  
14       efficiency number, and that gives you the level of  
15       rebate the customer is going to get.

16              Right now the CEC has no method or  
17       requirement for determining what that number is,  
18       other than just the word of the manufacturer to  
19       provide a number and an Excel plot to the CEC to  
20       establish the efficiency of their product on the  
21       CEC list of eligible inverters.

22              Just a few percent difference in that  
23       number can result in a very large amount of rebate  
24       money. For instance, on a 100 kilowatt PV system  
25       that number can be as -- a 2 percent difference in

1 efficiency number can result in a \$10,000 rebate  
2 difference. And, of course, if that difference is  
3 larger then the dollar refund will increase, as  
4 well.

5 What this is leading to right now is  
6 there's a lot of new inverters on the CEC list of  
7 eligible inverters. And that difference in  
8 efficiency numbers of the actual efficiency of the  
9 product versus what the manufacturer is stating,  
10 is leading to a competitive disadvantage for some  
11 manufacturers over others.

12 Recently I tested a product in my lab  
13 with calibrated test equipment for the UL  
14 requirements and found that it was about 7 percent  
15 less efficient than they stated on the CEC list.  
16 Which results essentially in that inverter being  
17 free by the amount of rebate that the customer  
18 would receive by using that product over another  
19 product.

20 I have submitted a letter to the CEC  
21 suggesting a simple test procedure that can be  
22 implemented through a third-party testing agency.  
23 And I think that the procedure would be amicable  
24 for all manufacturers. It's really not trying to  
25 single out one manufacturer or technology over



1       another. And, in fact, gives a little bit of  
2       leeway to the technology that is being tested so  
3       that it can be tested in a manner applicable for  
4       the technology.

5               I'm hoping that the Commission will look  
6       at that and possibly adopt that into a requirement  
7       for inverters being listed on the CEC program.

8               Basically the procedure is a very simple  
9       process. It would require about one hour in a  
10      testing lab. It could be done at the same time as  
11      the product is going through compliance testing  
12      for UL. And really would not, in the long run,  
13      cost any more to the total product.

14              And SMA is also willing to offer  
15      demonstrations on inverter efficiency measurement  
16      at our facility in Grass Valley for the Commission  
17      or anybody else who's interested. And we're also  
18      offering to host having a UL representative come  
19      into our facility and qualify product to various -  
20      - for the efficiency value.

21              So, with that, thank you very much.

22              MR. TUTT: Thank you. Next, we have a  
23      presentation from Tom Blair from the City of San  
24      Diego.

25              MR. BLAIR: Good morning, Commissioners,

1       and thank you for this opportunity to present some  
2       information from America's finest city where we're  
3       well into implementing solar for our systems.  
4       We've been dabbling in distributed generation for  
5       a number of years, and have a little bit of every  
6       type of system that you could be thinking of under  
7       the distributed generation category.

8                 And we've learned a few things over the  
9       years. To kind of set the stage, the City of San  
10      Diego is in the southwest corner of the state. We  
11      have a consumption from the utility of  
12      approximately 200 million kilowatt hours a year.  
13      We have generation systems capable of generating  
14      168 million kilowatt hours per year. We don't use  
15      all of that onsite. Some of it is sold back to  
16      the utility under purchase agreements. Some of it  
17      is not operational all the time. And we have  
18      found that you do have to keep on top of the  
19      systems to make sure that they are, in fact,  
20      producing what you expect them to be.

21                The topics that I'd like to discuss a  
22      little bit is just to give you a summary of our  
23      distributed activity; talk about our net meter  
24      projects; some aggregation of load that we would  
25      like to do in the future; the tariff barriers that

1 we've experienced; and talk about the San Diego  
2 region's net metering cap.

3 As far as the City's distributed  
4 generation we have the large Miramar landfill gas  
5 system which generates about 12 megawatts of  
6 power. And part of that is used onsite; part of  
7 it's used at our north water reclamation center.  
8 And the excess is sold to SDG&E.

9 At our Point Loma Wastewater Treatment  
10 Plant we have both a gas utilization facility,  
11 which is a qualifying facility; produces about 4.6  
12 megawatts. We have gas available there to  
13 increase the size of that to about 8.6 megawatts  
14 in the future. We also have a hydroelectric on  
15 the ocean water outfall from the wastewater plant  
16 that is capable of producing 1.3 megawatts.

17 In photovoltaic systems, we have four  
18 installed to this point. Our Richaven Green  
19 Building is a 54 kW; our Metropolitan Op Center  
20 has 30; Miramar Office is 65 kW; and police  
21 headquarters has a 30 kW system.

22 What we would like to do in looking at  
23 new systems and generation, the City has large  
24 areas of land which are all closed landfills that  
25 cannot be used for building construction that

1       could be used as sites for photovoltaic systems or  
2       other distributed generation. But there's  
3       currently not sufficient load at those sites from  
4       City use to be offset by any generation. So it  
5       becomes a very noneconomic process to put larger  
6       systems on the available space.

7               We also have parking lots throughout the  
8       City that could be covered with carports. We do  
9       have several carport systems in our inventory of  
10      photovoltaics already.

11             We also have aqueducts from all of the  
12      lakes in the eastern part of the County that feed  
13      into the City. And, in fact, there's one purchase  
14      before the PUC at this point that would purchase  
15      about 4.6 megawatts from a hydroelectric plant  
16      between two of the lakes in the area.

17             And we're also looking at solar to  
18      provide pumping power at about 90 of our pumping  
19      stations throughout the City.

20             Our problem in all these locations is we  
21      don't have a consistent load. It is very sporadic  
22      depending on what the actual water flow is. You  
23      can go from a zero pump usage to four pumps in a  
24      very short time, and that changes your actual load  
25      profiles significantly.

1                   So, what we'd like to be able to do, is  
2           because we do have these large number of potential  
3           sites for distributed generation with no load, we  
4           would ask that there be some aggregation allowed  
5           for other load that we do have within the City.  
6           And it's what I call a virtual aggregation. The  
7           utility calls it retail wheeling. So somewhere in  
8           between is something that we could probably come  
9           to agreement on.

10                   But, I think there is, throughout the  
11           state there probably are a number of cities that  
12           have old closed landfills with systems that they  
13           aren't using at this point, because there is no  
14           load at the site. So, it's a thing that you might  
15           consider in the future.

16                   Tariff barriers. We have our most  
17           recent project is at our police headquarters where  
18           we've installed a 500 kW cogeneration system. The  
19           building started out with a 1.2 megawatt load  
20           usage peak, and after we installed the 500 kW  
21           cogen and we've installed 30 kW photovoltaic at  
22           the same site, we're down to a 700 kW peak.

23                   We also did a number of other  
24           improvements. We did a lot of efficiency  
25           improvements in the building, including replacing

1 old T12 light bulbs, and a fan system in the  
2 parking garage that was a constant volume; we've  
3 changed to variable volume based on CO2.

4 So, throughout all of the improvements  
5 we brought the basic load for the building down.  
6 And now we almost meet -- we meet the weekend load  
7 with the installed cogeneration system. And we  
8 draw about 200 kW during the day on normal  
9 operating days.

10 Under those hybrid systems, because we  
11 started out, we activated the photovoltaic first,  
12 we went to a net metering tariff on the building  
13 initially. Then after we started the cogen  
14 system, because you can only have one tariff per  
15 meter, we had to shift to the ALTOU DER, which  
16 then charges standby fees and nuclear  
17 decommissioning PPP charges on our own self  
18 generation at the site.

19 We're waiting to see what will happen  
20 with the photovoltaic component on that. We  
21 haven't received the bill yet, but I expect it's  
22 on the way. So the tariff adjustments, you know,  
23 the net metering advantage that you would have if  
24 the system were out just on any building that  
25 didn't have a cogen are significantly different

1       than what you receive when you have other  
2       cogeneration at the site.

3               This is a similar problem that you have  
4       at locations where you have a campus of buildings  
5       and they're all on one master meter for the site.  
6       And yet each building has significant load on its  
7       own that could be net metered from a photovoltaic  
8       system on the roof. So those are tariff  
9       considerations that should be considered.

10              Also in looking at the basic tariff, I  
11       know earlier the speakers talked about they're  
12       worried about the peak load cost in consumption  
13       because it's unpredictable. Since these systems  
14       do all work to bring down the peak, there may be,  
15       you know, additional -- you're really offsetting  
16       of the higher cost kWh than just the wholesale kWh  
17       when you are putting in these systems.

18              Generation metering. We also, under the  
19       rule 21 workshop that I've been participating with  
20       over the years, we do have meters installed in  
21       each of the generators because they're more than  
22       30 kW systems. And there has been some extra cost  
23       to the installations because of that metering  
24       requirement. There are other meters that would be  
25       nonutility meters. And since the component for

1 the photovoltaics under the net metering tariff  
2 isn't used to actually compute the tariffs, there  
3 really is no need to have a utility grid meter on  
4 the generator outputs as long as the data is there  
5 and you have the telemetry.

6 Looking at rates over the years we've  
7 noted that the demand charge components now are  
8 much lower than what they were before the start of  
9 deregulation. If you look at your '97 ALTOU rates  
10 and customer rates, they were somewhere around \$20  
11 on a peak charge. If you look at the same rate  
12 today, it's about a \$5 charge. So that also has a  
13 significant impact on the payback on any of these  
14 systems that you're installing and should be  
15 considered as part of the whole market design when  
16 you're looking at the tariff structure.

17 Net metering cap. For SDG&E we have  
18 about a 19 megawatt cap for the region. We have a  
19 City goal of installing 50 megawatts of new  
20 renewable energy within the next ten years. So,  
21 as you can see, we're already in a problem. And,  
22 of course, it remains to be seen whether we'll  
23 make that 50 megawatt installation yet. But we  
24 are working hard to come up with new and creative  
25 ways. We will be going out with requests for



1       proposal to get large solar systems and try and  
2       match distributed generation where we have load.

3               That's not just for city building, our goal.  
4       Our goal is actually for the region, for the City  
5       of San Diego, city limits.

6               And looking at the rates over the last  
7       couple of years we expect that we could reach our  
8       cap as early as two years from now. It will  
9       depend on continuing employment of solar systems;  
10      but the ramp has been significant.

11              That concludes my presentation.

12              PRESIDING MEMBER GEESMAN: I have a  
13      question for you. In terms of -- I mean you  
14      obviously operate in a pretty transparent fishbowl  
15      environment. Just curious as to the response of  
16      either your city council members or members of the  
17      public as to the level of priority that the City  
18      has attached to pursuing technologies that, you  
19      know, we hear quite frequently are expensive and  
20      not cost effective.

21              MR. BLAIR: The city council has been  
22      very supportive; and all the members support solar  
23      installations. And have, in fact, required for  
24      all new city construction that at least 10 percent  
25      of the load be provided through self generation.

1       So we look at all of our new city projects for  
2       that.

3               They've also adopted the lead criteria  
4       to look at using green building sustainable design  
5       for all new buildings and remodels. And with the  
6       50 megawatt goal we're really looking at  
7       significant deployment throughout the City. So I  
8       don't think I could get a more supportive.

9               And we do in all of our solar systems,  
10       we have about a 24-year payback if you look at the  
11       actual numbers on the systems. But we expect to  
12       own the buildings longer than that, so they do  
13       actually pay eventually.

14               PRESIDING MEMBER GEESMAN: Thank you,  
15       Tom. And thank you for the aggressive leadership  
16       the City has shown in this area.

17               MR. TUTT: Thank you, Tom. The next on  
18       my list is Jan MacFarland. I don't see her in the  
19       audience. So, -- hi, Jan.

20               MS. MacFARLAND: Good morning,  
21       Commissioners and staff and audience.  
22       California's regulatory framework for solar is  
23       something that really works; and it's something  
24       that doesn't often happen in government, based on  
25       my experience in government in the last number of

1       years.

2                   The combination of private customer  
3       investment, ratepayer incentives, tax credits, CRS  
4       exemptions and net metering really has delivered a  
5       lot of solar projects to interested homeowners.  
6       It's been very successful. Solar is what the  
7       customers want, as well.

8                   Unfortunately, the demand for solar and  
9       PV incentives has really exceeded the available  
10      funding. And here at the CEC we've managed to  
11      burn through more than five years of money in less  
12      than two years. And I want to thank you  
13      personally for all the work that you've done to  
14      keep the programs going, even though there wasn't  
15      adequate funding over the past year. I know  
16      that's not been very easy, and we are very  
17      appreciative.

18                  The other thing that the Commission did  
19      which was very important is they gave us access to  
20      the data so we could examine what was really going  
21      on in the program, and recommend some changes in  
22      the program in terms of declining rebates and  
23      those kinds of things.

24                  So, we were able to propose declining  
25      rebates that will essentially go down to zero out

1 over a decade. Those proposed rebates were also  
2 based on the continuation of the net metering and  
3 the REC ownership, which is very important to us.

4 In examining the data we also learned  
5 that the programs are actually working and  
6 resulting in decreases in overall program costs.  
7 Some are between 10 and 13 percent, between '02  
8 and '03. We don't know quite why that is. We  
9 think it might be the increased competition of  
10 more than 500 companies and the 4000 jobs.

11 But I think the point here in terms of  
12 data and access to information is that we need to  
13 have that to make reasoned analysis and  
14 adjustments of the program over time. And you  
15 have given that to us and we very much appreciate  
16 it.

17 Because we're in this boom-and-bust  
18 cycle and we're out of funding here at the CEC,  
19 after this year, and in the PG&E and San Diego  
20 service territories we just learned this year,  
21 we're really in a boom-and-bust cycle. And so  
22 CalSEIA has taken a lot of time to develop a  
23 program that would give the industry certainty in  
24 terms of financial incentives as well as  
25 regulatory certainty.

1                   So we're proposing declining rebates  
2           over time, both at the CEC, which has been  
3           adopted; it hasn't been adopted at the PUC. We  
4           filed a number of motions to get access to the  
5           data. We've asked for the rebates to decline from  
6           4.50 to 4 for better funding utilization, and  
7           haven't been able to get things accomplished  
8           there. We think eventually that will happen, but  
9           it's very important that we get the data and we  
10          can make some more program suggestions of how to  
11          proceed.

12                   In addition to the CEC and the PUC  
13          program, because of the Governor's leadership  
14          we've been looking at the new construction  
15          program. And what we think makes the most sense  
16          is to adopt a zero energy building approach which  
17          uses maximum efficiency, thermal and PV  
18          applications. We think that's the most cost  
19          effective approach. We think that it has real  
20          value to the homeowners or the home buyers, as  
21          well as the building community.

22                   We want to make sure that we have a good  
23          working relationship with the builders because  
24          they're our customers. And they have the chance  
25          to identify what products that they want. And we

1       make sure that we deliver not only the products,  
2       but the proper amount of training for their  
3       contractors that we suspect that they will want to  
4       use.

5               In terms of how we do think that if we  
6       did combine forces with the top builders and the  
7       PV manufacturers and came up with a good, a  
8       reasonable incentive package over time, that we  
9       could probably get to 50 percent of all homes by  
10      the end of the decade. But that would be really  
11      dependent on how we started in the first couple of  
12      years. But we do think there's incredible  
13      potential there.

14             In addition to new construction we  
15      worked on a solar thermal proposal. We think it's  
16      ridiculous that we're using precious natural gas  
17      resources to heat water, in the desert and the  
18      valley regions, especially. Affordable housing  
19      and state-owned buildings is also something we're  
20      interested in.

21             We are very interested in locking in  
22      financial certainty over time. We want to make a  
23      transition to performance-based incentives. We  
24      think that's very important. Because of that we  
25      proposed a pilot at the CEC to make sure that we

1       come up with a workable program that not only, you  
2       know, is based on performance, but there's a lot  
3       of feedback mechanisms in terms of measuring what  
4       the system's output is and who's going to do that,  
5       and how does the payment stream work. So we want  
6       to make sure we have a program that works before  
7       we make that transition. But we're ready to do  
8       that.

9                So, overall our plan is declining  
10       rebates; getting off of the ratepayer incentives  
11       over time; REC ownership; net metering is key.  
12       Our goal is for PV to be competitive at the retail  
13       rate in the end of this ten-year program, which  
14       would be in the 10 cent to 12 cent a kilowatt  
15       hour. And that thermal solar technologies have  
16       wide applications.

17               We must enable to do this to have  
18       transparent market, access to the data and  
19       reasoned analysis for program adjustment.

20               If you look at the success of the German  
21       and the Japanese programs, I think the overall  
22       long-term policy commitment is the most important.  
23       Perhaps if you look at Germany they have clear  
24       access to the program data, which is also a very  
25       important thing.

1 I'll be filing formal comments on all  
2 your specific questions and participating in your  
3 roundtable this afternoon.

4 One other thing I did want to bring up  
5 is the House version of the tax bill that came out  
6 last Friday did not include the efficiency or the  
7 solar measures. And we're going to work very hard  
8 to make sure both efficiency and solar measures  
9 are in there. And perhaps we could all work  
10 together on that.

11 Thank you.

12 MR. TUTT: Thank you. Commissioners,  
13 it's 12:15, and I just want to do a process check.  
14 I estimate we have about another half an hour to  
15 45 minutes presentations. We could take a break  
16 for lunch now and do some after lunch, or continue  
17 on and then break after the presentations.

18 PRESIDING MEMBER GEESMAN: Why don't we  
19 break after the presentations.

20 MR. TUTT: Okay. So, then the next  
21 person to do a presentation is Bernadette Del  
22 Chiaro. And let's see if I can pull yours up,  
23 Bernadette.

24 MS. Del CHIARO: Thank you, Tim; thank  
25 you, Commissioners, for allowing me to speak



1       today. I'm going to keep my presentation very  
2       very short, not only in mind of our growling  
3       stomachs, but also in part because I didn't  
4       actually have that much time to put into this  
5       presentation. And I will submit more detailed  
6       followup comments and hope this is just the  
7       beginning of a conversation about how to  
8       accelerate renewable DG.

9               My name is Bernadette Del Chiaro; I'm  
10       the Clean Energy Advocate with Environment  
11       California Research and Policy Center. We're the  
12       new home of CalPERG's environmental program.  
13       We've been around for 30 years in California; and  
14       represent about 70,000 members around the state.

15              And we have a history of working on  
16       renewable energy, both in the State Legislature,  
17       and also with the Administrations. Specifically  
18       we're sponsors of the Brulte bill, which, of  
19       course, established the tax credit to begin with.

20              And we also have been involved in a  
21       number of other programs that had mandated clean  
22       technologies in California. And I want to just  
23       first start off by saying it's always a pleasure  
24       to come to this particular agency where we have,  
25       as the State of California, proudly led the nation

1 in terms of establishing standards and mandates on  
2 energy efficiency and other clean energy programs.

3 Some others that come to mind are, of  
4 course, that are analogous to one of the programs  
5 we're working on right now are programs such as,  
6 of course, the zero emission vehicle. Where, in  
7 fact, California has mandated that auto  
8 manufacturers meet an environmental goal. And  
9 that that is even more sort of far reaching than  
10 what we're proposing today. And that that was a  
11 technology forcing.

12 Today with solar PV, of course, the  
13 technology is there. And what we just need to do  
14 is get it in the hands of the homeowner.

15 So, with that I will just go into my  
16 very brief presentation.

17 PRESIDING MEMBER GEESMAN: Let me  
18 interrupt you --

19 MS. Del CHIARO: Sure.

20 PRESIDING MEMBER GEESMAN: -- just to  
21 correct the record. I think Jim Brulte was  
22 probably still in high school when your  
23 organization actually implemented the first solar  
24 tax credit, which was sponsored by Assemblymember  
25 Gary Hart --

1 MS. Del CHIARO: Okay.

2 PRESIDING MEMBER GEESMAN: -- in 1977,  
3 if I recall.

4 MS. Del CHIARO: Good to know. Thanks  
5 for the education.

6 Here we go. So, very brief overview.  
7 Sort of tried to take some of the questions and  
8 just summarize them, specifically just what should  
9 our goals be. Again, in summary, some basic  
10 principles that we think that the Commission  
11 should follow, and that the State of California,  
12 in general, should follow. Some very specific  
13 how-to's, going into, again, a little bit of the  
14 benefits of solar, even though we've talked a lot,  
15 other presenters have talked a lot about those  
16 today. So I kept those short.

17 What I see as pitfalls or missed  
18 opportunities. Where we are today. The critical  
19 sort of cross-roads in our decision making. And  
20 then some brief conclusions.

21 Basically right now, you know, obviously  
22 we would strongly support the Commission in  
23 preserving existing goals. What are goals are  
24 today of commercializing renewable technologies,  
25 especially emerging technologies, by creating

1 economies of scale. And obviously helping to  
2 promote and develop competitive markets and bring  
3 down the cost. Those are obviously the over-  
4 arching goals right now with the emerging  
5 renewables program. And we would love to see that  
6 continue.

7 And in addition to that, we would  
8 suggest that sort of building upon one of the  
9 previous IRP reports, I believe, established a 1  
10 percent, if I'm not incorrect, by 2006 DG goal.  
11 We would actually suggest that the Commission  
12 establish a bigger goal; 3 percent is a back-of-  
13 the-envelope goal that I'd propose today. But  
14 basically the idea being that the Energy  
15 Commission, I would suggest, establish some kind  
16 of vision of where we should be with renewable DG  
17 by a certain date. And then set a plan for  
18 getting there, and have that plan be, you know,  
19 real. And the other recommendations that Jan and  
20 others have made today, something that industry  
21 and the public, alike, can count on.

22 And then obviously we can continue to  
23 accelerate the reduction in costs in order to  
24 bring about this DG future by jump-starting new  
25 markets. Again, I think the policy that we're

1 supporting right now in the State Legislature,  
2 which I'm sure all of you are familiar with, is  
3 Senator Murray's bill 1652, attempts to do that  
4 within one, you know, industry in construction, in  
5 California's new construction of single family  
6 homes.

7 But there's other ways of doing that, as  
8 well. Obviously we would also support in  
9 conjunction with that not just mandates, but also  
10 incentives to help bring down the costs. So we  
11 think that the public would be supportive of  
12 increasing the public goods fund and creating a  
13 new solar fund. And I'll talk a little bit more  
14 about that.

15 And then continuing to remove any other  
16 barriers that are out there for getting DG onto  
17 people's homes and businesses and government  
18 buildings.

19 Some basic -- five basic principles.  
20 Nothing here is rocket science, but the government  
21 should play a lead role in creating this plan and  
22 prioritizing, promoting and removing barriers for  
23 renewable DG. It is a critical role that  
24 government has played and should continue to play.

25 That utilities should also play a

1 critical role, and that that role should be  
2 supportive and not stand in the way of emerging,  
3 bringing about DG. And that developers, likewise,  
4 should also play a lead role, obviously in the  
5 industry that is building the buildings that  
6 should have DG installed as part of them, during  
7 construction ideally is the most cost effective  
8 way. The developers should play a lead role by  
9 ramping up construction, installation of DG over  
10 time.

11 And then ultimately another basic  
12 principle that's been talked about already today,  
13 but that obviously the goal of protecting the  
14 consumer has to be paramount. And then ultimately  
15 finally renewable DG needs to complement energy  
16 efficiency and other renewable energy goals, such  
17 as the RPS.

18 PRESIDING MEMBER GEESMAN: I wonder if I  
19 could have you focus for a minute on (b) and (c),  
20 the relative role in renewable DG that you see  
21 developers playing in contrast to utilities?

22 MS. Del CHIARO: Okay.

23 PRESIDING MEMBER GEESMAN: If you'd  
24 elaborate on that a bit?

25 MS. Del CHIARO: Sure. I think, if I

1 understand your question, the way I see it is  
2 utilities should not stand in the way --

3 PRESIDING MEMBER GEESMAN: Right,  
4 they're supportive, but the developers should play  
5 the lead.

6 MS. Del CHIARO: Developers should play  
7 a lead role in physically installing the DG. And  
8 whether that be in accepting a standard that's  
9 across the board, across the State of California,  
10 that gets us to a clean DG future, or in some  
11 other role that may be just as effective.

12 But they should play the role of  
13 actually doing, you know, installing it on  
14 people's homes, on businesses. It's a very broad  
15 concept.

16 PRESIDING MEMBER GEESMAN: The state  
17 regulates utilities, though, and I'm not certain  
18 that, although we certainly regulate developers,  
19 the jurisdictional leverage is not quite as clear.

20 MS. Del CHIARO: Yeah, I don't think --  
21 this is the California State Government in  
22 general, is what I'm talking about. I'm not sure  
23 if the CEC is -- if it's the appropriate role for  
24 the CEC to mandate this on builders. This gets  
25 into -- some of the other people have touched upon

1 title 24, which sort of dovetails with my point in  
2 (e) here, which is we don't think that -- do we  
3 think title 24 needs to be continued to be  
4 tightened, and improved; and that solar is  
5 somewhat of a -- it's a separate concept.

6 In other words, we don't think that the  
7 energy budget for a new home, for instance, should  
8 be lowered in order to accommodate for PV, or that  
9 PV should get a credit. Energy efficiency needs  
10 to come first, both the consumer and for  
11 California's energy system in general.

12 So, some basic how-to's, some simple  
13 how-to's. The first one is, of course, what  
14 Senator Murray's bill does is it sets a minimum  
15 standard for solar DG and new development.  
16 Specifically what this bill does, and there's a  
17 lot of misunderstandings about it, but it will set  
18 a very small goal starting in 2006, so enough into  
19 the distance to give industry to ramp up. And  
20 then just ramp it up slowly over time.

21 Right now there's literally a blank line  
22 in the bill and it has still yet to be worked out  
23 exactly what that percentage is. We had 25  
24 percent coming out of the -- or going into the  
25 Senate. And right now it's blank. But somewhere



1 along the lines of 15, 20 percent would be, I  
2 think, a reasonable goal. That, just, you know,  
3 back-of-the-envelope 15 to 20 percent is about 40  
4 megawatts would be installed in California in 2006  
5 if we were to see this program implemented.

6 And then to go along with that mandate,  
7 to get the biggest bang for our buck, the biggest  
8 bang of ratepayer dollar, we recommend that we  
9 also then increase the buy-down to make sure that  
10 that solar system that the consumer buys is cost  
11 effective; and to help, you know, alleviate some  
12 of the burdens on the builders for installing  
13 solar.

14 Quick back to the --

15 PRESIDING MEMBER GEESMAN: Do you --

16 MS. Del CHIARO: Yeah?

17 PRESIDING MEMBER GEESMAN: Do you see  
18 that as a rebate up front as opposed to an ongoing  
19 performance subsidy?

20 MS. Del CHIARO: I have not looked into,  
21 and I don't have comments prepared for that, but I  
22 think a performance-based rebate makes a lot of  
23 sense, as long as there are, again, consumer  
24 protections in there. But I think that makes a  
25 lot of sense in a lot of ways.

1                   But, again, back-of-the-envelope, just  
2                   so that we have a sense of what this means to, you  
3                   know, I have a sense of what this means to my  
4                   members advocating for it, 50 cents a month would  
5                   give us about \$1.5 billion for a new solar fund if  
6                   we were to do this over the next ten years.

7                   Again, from my experience, interaction  
8                   with our members and with the public on a daily  
9                   basis, I think people would be more than willing  
10                  to spend this kind of money to really truly bring  
11                  about a solar energy future in California.

12                 You know, obviously continuing either  
13                 the state tax breaks or for the State of  
14                 California to support such tax breaks at the  
15                 federal level, whichever one, would be a good  
16                 thing to keep that going.

17                 All the other things, that metering  
18                 should be lifted; we should have worker training  
19                 programs which not only will bring more jobs to  
20                 California but will insure that the solar systems  
21                 are installed properly; and again, the consumer  
22                 protections are there.

23                 And then I think, you know, giving  
24                 renewable energy credits to solar DG or other  
25                 renewable DG and incorporating that into the RPS

1 makes a lot of sense.

2 And then, again not to state the obvious  
3 and waste all of our time, but there's a couple of  
4 benefits that I thought warranted a quick  
5 highlight here. Obviously again as others have  
6 spoken about already today, building solar during  
7 construction is the most cost effective way of  
8 installing solar, as opposed to retrofitting onto  
9 existing buildings.

10 And again, I think we have the  
11 responsibility to ratepayers to manage those  
12 dollars as efficiently as we can. And so I think  
13 by matching the rebate that we give for the  
14 retrofit market and keeping that going, that's  
15 obviously important for the overall energy  
16 picture. But then also creating programs that are  
17 real and that will truly get solar homes out there  
18 built in the coming years is important for us to  
19 do, as the State of California. And by doing  
20 that, by requiring it as a standard feature on new  
21 homes is a very cost effective way of doing it.

22 I should mention, I'm not sure if -- I'm  
23 sure the Commission, you guys are familiar with  
24 this, but the point of rolling the cost of the PV  
25 system into low-interest loans negates any kind of

1 complicated sort of state structure for loans  
2 systems. And it just enables the homeowner, again  
3 getting at what the man from SMUD was talking  
4 about, it sort of cuts out that difficult decision  
5 making process; enables the homeowner just to have  
6 one bill that they pay for their mortgage.

7 And many home loan lenders, I should  
8 mention also, use what's called an energy addendum  
9 that Fannie Mae and Freddie Mac developed that  
10 allows anybody who's on sort of the cusp of credit  
11 for, you know, of being allowed to have a certain  
12 size mortgage, whatever additional costs, energy  
13 efficiency or solar equipment adds to the cost of  
14 the home, they're given that credit, so they're  
15 not knocked out of them buying that house.

16 And this was also mentioned earlier, but  
17 I think it's a key part of creating solar as a  
18 standard feature, is that the planners and the  
19 architects of the large developments that are  
20 going up around the state are able to design solar  
21 homes and orient the homes appropriately, place  
22 them among the trees appropriately.

23 And again maximize buy-down funds is  
24 something I already touched upon. To give us just  
25 some very specific air pollution reduction

1       benefits, back-of-the-envelope again, using CARB's  
2       1999 -- no actually -- yeah, 1999 CO2 emissions  
3       data for new natural gas combined cycle power  
4       plant, and again, back-of-the-envelope, 1 megawatt  
5       of solar operating about 18 percent capacity  
6       factor on average, reduces the amount of air  
7       pollution equivalent to around 70 cars per year.

8               So if we did this 15 to 20 percent  
9       minimum standard, actually saw that kind of  
10      penetration in California starting in 2006, that  
11      would be about 2800 cars equivalent removed from  
12      the road every year in terms of air pollution,  
13      which is no small number.

14             Obviously the reducing energy demand is  
15      key. Planners here within the CEC can better  
16      account for decreased peak load if we do this in a  
17      very well planned out, well thought out way which  
18      is what a standard or minimum standard allows us  
19      to do.

20             And then, of course, the jobs that we  
21      will create in California is a clear benefit. Our  
22      research shows about seven times more jobs than a  
23      natural gas power plant.

24             Two things on some points that have been  
25      brought up. Creating solar-ready homes, as

1       opposed to solar, actual solar homes. I think  
2       it's just a missed opportunity, potentially adds  
3       cost to the house without giving the homeowner the  
4       benefit of the PV generated system.

5               And then the second is substituting  
6       solar; I already talked about for energy  
7       efficiency hurts the homeowner and the consumer  
8       and is not a good idea. Although I agree that  
9       building more efficient homes and adding solar to  
10      that is obviously a good idea.

11             So, just in closing, California needs to  
12      continue to lead the nation. We need to do both  
13      things, continue with mandates. We obviously  
14      already have a government building mandate, which  
15      could be better implemented, but we still have the  
16      mandate on the books and are making progress on  
17      that.

18             We have along similar lines a renewable  
19      portfolio standard which is, in essence, a minimum  
20      standard or a mandate on the utilities. We have  
21      net metering, which is another sort of a mandate,  
22      the utilities buy back the energy generated from  
23      renewable DG.

24             And then we should continue our  
25      incentives for via the rebates and the tax breaks.

1       And expand these. So expand the mandate with a  
2       new building minimum standard. Allow RECs to go  
3       be part of the RPS. Expand net metering. And  
4       then include consumer protections, I need to put  
5       in there. And, again, expand our incentives.

6               And just a couple -- one quick thing on  
7       incentives. We have spent, since we originally  
8       sponsored Senator Murray's bill last spring, we  
9       have spent a lot of time in conversation with  
10      builders. And some of the largest builders in the  
11      country that are actively building thousands of  
12      homes here in California.

13             Some of whom have already experimented  
14      with solar, as well, to get their sense of could  
15      we do this without a mandate. Is there an  
16      incentive that is big enough to get a significant  
17      percentage of the new homes in California built  
18      with solar.

19             And to this point I still remain open to  
20      if there is an incentive that could work. But at  
21      this point, from having these one-on-one  
22      conversations with the actual guys out there in  
23      the field building the homes, there doesn't seem  
24      to be one that, at least from the environmental  
25      community, we could support.

1                   Some of the ones that have been put  
2           forward are ideas such as, you know, basically  
3           streamlining CEQA, and not having any  
4           environmental review of new housing projects would  
5           be something that the builders would, you know,  
6           grab onto and then build lots of solar homes. We  
7           obviously can't support that. Don't think that's  
8           good policy for California.

9                   There are other ideas that I'd be  
10          interested if Tom from San Diego is still here, if  
11          he could touch upon, at some point, about the City  
12          of San Diego. I don't think he mentioned this in  
13          his overview, but have done an accelerated, sort  
14          of go-to-the-front-of-the-line in the local  
15          planning review process for solar development and  
16          solar homes.

17                  And based on a conversation I had about  
18          a month ago with somebody at the city hall that  
19          has really resulted in a whole lot of new interest  
20          from the builders perspective in solar.

21                  So I bring up all this only in that I  
22          think that ultimately, given where the industry is  
23          on new homes, that the best way we're going to  
24          actually see solar homes built in the new future  
25          in a meaningful way is to actually have a minimum



1 standard. And have that standard just be  
2 something that's small enough and ramped up that  
3 it's reasonable. And both industries, both the  
4 manufacturers and the builders, can meet.

5 PRESIDING MEMBER GEESMAN: I want to  
6 come back then, --

7 MS. Del CHIARO: Okay.

8 PRESIDING MEMBER GEESMAN: -- to this  
9 question of why should we focus on the builders?  
10 Why don't we just mandate it on the utility?

11 MS. Del CHIARO: Well, because I think,  
12 as distributed generation, at least solar in  
13 particular, and SMUD, I think, touched upon this,  
14 but that it's best owned by the homeowner.

15 PRESIDING MEMBER GEESMAN: And why is  
16 that best?

17 MS. Del CHIARO: Simply because you own  
18 the roof, and you own the building.

19 PRESIDING MEMBER GEESMAN: But why is  
20 that best?

21 MS. Del CHIARO: Well, I'd turn that  
22 question over to SMUD, who dabbled with the  
23 experience of a utility owning the systems on a  
24 private owner's home.

25 MR. FRANTZ: How would you mandate it?

1       How would that actually work --

2               PRESIDING MEMBER GEESMAN:  I don't think  
3       we would on municipally owned utilities, the  
4       Public Utilities Commission is in the habit of  
5       mandating things on the three investor-owned  
6       utilities quite frequently.

7               MR. FRANTZ:  You own the line extension  
8       that goes up to the front door, the utilities are  
9       owning that, so.

10              PRESIDING MEMBER GEESMAN:  Yeah, I  
11       mean --

12              MR. FRANTZ:  We install it, they --

13              PRESIDING MEMBER GEESMAN:  -- arguably  
14       the utility could qualify for accelerated  
15       depreciation and other federal tax benefits that  
16       might be available.  Arguably you'd have a source  
17       of maintenance.  Arguably you'd have a method of  
18       sizing systems that optimized systemwide benefits.

19              I'm not suggesting that we necessarily  
20       do this, but I think in the interests of  
21       intellectual inquiry --

22              MS. Del CHIARO:  Um-hum.

23              PRESIDING MEMBER GEESMAN:  -- it's  
24       something that probably ought to be considered  
25       before we set about increasing the cost of new

1       housing for Californians by too substantial a  
2       degree.

3               MS. Del CHIARO: Yeah. I agree. Be  
4       interested in hearing what PG&E and other  
5       utilities think about that and how they would  
6       embrace that idea.

7               Two quick thought that just come to mind  
8       off the top of my head is one, with the current  
9       process of having individual homeowners and  
10      business owners actually pay for the system, we're  
11      maximizing public/private dollars. And that, you  
12      know, ultimately helps make the otherwise  
13      expensive technology pretty cost effective.  
14      Because, again, you're looking at your rates as  
15      a -- your retail rates as opposed to wholesale.  
16      So that's one reason, I think.

17              So, my last point, just that everybody  
18      needs to do their part. And I think we've seen,  
19      you know, government and ratepayers and the public  
20      and people starting to get their feet wet on  
21      renewable DG. And I think we're at a point now  
22      where everybody needs to throw their hat in the  
23      ring and do their part.

24              And that all of this should be, again,  
25      and I don't, you know, need to really remind the

1 people in this room, but there are urgent social,  
2 economic and environmental needs for reducing  
3 California's use of fossil fuels and nuclear  
4 power.

5 And one fact that, to me, is compelling  
6 is the fact that we add at least the State of  
7 Vermont population to our state every single year.  
8 And, of course, the greatest growth in our energy  
9 comes during peak time when solar works best.

10 So, making solar building policies, both  
11 through mandates and incentives, can insure that  
12 we actually have a sustainable future here in  
13 California.

14 And then in closing, here's a partial  
15 list of supporters for a minimum standard in  
16 California. It includes not just the  
17 environmental community, but also so solar power  
18 companies, some mortgage lending companies and one  
19 of the leading builders of solar homes here in  
20 California, Clarum Homes, as well.

21 MR. FRANTZ: Let me ask one more follow-  
22 up question on this --

23 PRESIDING MEMBER GEESMAN: Yes, please.

24 MR. FRANTZ: I think that was a very  
25 useful interchange. I want to understand your

1 suggestion -- just wanted to make sure I  
2 understood your proposition here. Are you saying  
3 mandating the utilities, themselves, install PV on  
4 new homes?

5 PRESIDING MEMBER GEESMAN: Not  
6 necessarily. Just mandating, giving each utility  
7 a quota.

8 MR. FRANTZ: A quota of how many have to  
9 be --

10 PRESIDING MEMBER GEESMAN: Right.

11 MR. FRANTZ: As a condition of hookup or  
12 something like that.

13 PRESIDING MEMBER GEESMAN: Right.

14 MR. FRANTZ: Well, you could sort of  
15 move it towards a wholesale rather than a retail  
16 business, --

17 PRESIDING MEMBER GEESMAN: That's  
18 correct.

19 MR. FRANTZ: -- or at least a part of  
20 it.

21 PRESIDING MEMBER GEESMAN: That's  
22 correct.

23 MR. FRANTZ: Yeah. Well, you know, as  
24 John Kenneth Galbraith said, free markets were  
25 first a matter of secular faith, and have now

1       become a religion. If you want to attack that,  
2       you've got my support, I assure you.

3                       (Laughter.)

4                       PRESIDING MEMBER GEESMAN: No, I'm  
5       motivated by trying to figure out as many  
6       different ways of achieving some of the  
7       penetration numbers that the Governor has  
8       indicated that he would like to see state  
9       government achieve.

10                      MR. TUTT: Next we are going to hear  
11       from Bob Raymer from the California Building  
12       Industry Association.

13                      MR. RAYMER: Thank you, Tim, and  
14       Commissioners. I'm Bob Raymer, Technical Director  
15       for the California Building Industry Association.  
16       And to take any question now that we are opposed  
17       to mandates, but we're certainly open to just  
18       about everything else on the table.

19                      CBIA has worked closely with the Energy  
20       Commission for over two decades now on its energy  
21       efficiency standards. For the first decade you  
22       couldn't say we were the best of friends; we  
23       fought like dogs and cats.

24                      PRESIDING MEMBER GEESMAN: That was my  
25       decade.

1                   MR. RAYMER:  However, by around 1994/95  
2                   we became a warmer and friendlier industry, and  
3                   quite frankly, the staff, along with a number of  
4                   the Commissioners, thought that there was a number  
5                   of ways we could develop a productive working  
6                   relationship.  And that has been established and  
7                   it has stayed there ever since.

8                   For the last three updates of your  
9                   energy efficiency standards, something that would  
10                  normally break out in full war, we support it;  
11                  we'll be supporting the energy efficiency  
12                  standards on July 21st in front of the Building  
13                  Standards Commission.  We supported the AB-970  
14                  emergency update.  And we supported the 1998  
15                  update.

16                  So, with that, it's certainly no idle  
17                  boast that we've come a ways in working with  
18                  government in the regulation.

19                  I'd also like to point out that the  
20                  regulation of energy in new residential  
21                  construction is the single most regulated part of  
22                  new construction.  It exceeds that of structural  
23                  fire protection, soils, masonry, concrete, fire  
24                  safety, disabled access all combined.

25                  Having said that, though, the energy

1 efficiency regs have succeeded in what they  
2 intended to do. There was a lot of, let's say,  
3 trial and error in the '80s, but certainly by the  
4 end of the '90s, and to the standards that are  
5 taking effect probably a year and a half from now,  
6 we've done a lot of fine tuning. They certainly  
7 are much tighter than what you see at the federal  
8 level. We're about 30 to 40 percent more tighter.

9           However, that does create a bit of a  
10 problem in the fact that the Energy Commission  
11 Staff and the Commission has been so successful in  
12 coming up with a set of efficiency regs that work  
13 so well, that presents a bit of a problem for the  
14 cost effectiveness for an individual homebuyer  
15 when the issue of PV comes up. I'll speak to more  
16 of that towards the end.

17           Right now we'd be looking at a 2.5  
18 kilowatt system, financing about \$150 a month to  
19 save about \$50 to \$60 a month. And for the new  
20 homebuyer, if they're, of course, asked to deal  
21 with that directly they don't think much of it up  
22 front.

23           Having said that, I wanted to spend my  
24 comments today speaking to incentives, and not  
25 just the cash incentives, but other things that



1 are out there that should be at least reviewed and  
2 investigated to see about helping us work with the  
3 manufacturers and others in getting this market  
4 increased.

5 To accomplish that one or more of the  
6 following concepts should be incorporated into  
7 local voluntary pilot programs that are intended  
8 to promote increased insulation of residential  
9 photovoltaic energy systems.

10 I would like to start out by saying a  
11 good place to start looking would be the 60-plus  
12 jurisdictions. And by the way, after we come back  
13 after lunch, I'll have copies of this for  
14 everyone. But right now I only brought enough for  
15 the Commissioners and a few others.

16 We've established the Building Industry  
17 Institute. It's been focusing primarily on energy  
18 efficiency items for the last five to six years.  
19 One of the items that the utilities and the CEC  
20 helped us promulgate was the community energy  
21 efficiency program. This is where we've gone to  
22 individual cities and counties throughout  
23 California and we've worked with building  
24 departments, the board of supervisors or the city  
25 council in developing a list of incentives that

1 the jurisdiction can offer, but may not work well  
2 on a statewide basis. Such as decreased fees,  
3 increased plan check time, et cetera, et cetera.  
4 Things that might be attractive to a builder if,  
5 indeed, they were to go beyond the minimum energy  
6 efficiency standards of the state's energy  
7 efficiency regulations.

8 We've been able to accomplish that in  
9 five dozen-plus jurisdictions. As opposed to what  
10 was able to be accomplished in the '80s and early  
11 '90s when a different attempt was tried at the  
12 state level where one program was intended to fit  
13 all. Virtually every jurisdiction in the state  
14 had a problem with that approach.

15 We tailored our program starting at the  
16 bottom line where the rubber hits the road, what  
17 can the local building department do because  
18 they're the ones enforcing all of this. And what  
19 can they do, what is available within that city or  
20 county that is able to help reduce or make  
21 increased energy efficiency more attractive to the  
22 builder. And, indeed, we've got 60 jurisdictions  
23 that have done that.

24 You know, obviously the most successful  
25 incentive today is the cash incentive. Tax

1 credits or the buy-down program have been  
2 enormously successful in moving the market.  
3 However, as was mentioned earlier today, when the  
4 subsidy disappears and in the Shea example from  
5 San Diego, that, in the first phased project I  
6 think there's like 100 units that was offered in  
7 the first phase. It was a standard feature,  
8 photovoltaics was a standard feature. It was put  
9 in there.

10 The cost of the system minus the subsidy  
11 was effectively into the mortgage, and that was  
12 the end of it. Everyone liked what happened. As  
13 soon as the subsidy was taken away for phase two,  
14 the consumer demand dropped right through the  
15 floor. When you were asked do you want to pay the  
16 \$18,000 to \$20,000 for the system, the answer was  
17 no. I think they had one taker for phase two, as  
18 opposed to 100 in phase one when it was a standard  
19 feature.

20 Having said that, though, the cash  
21 incentives and the tax credits have been  
22 enormously successful. It's just that they're  
23 somewhat unreliable simply because they run out.  
24 They've helped us put in about 1000 to 1100 units  
25 in new construction over the last two years. That

1       was certainly a far cry from where we were four to  
2       five years ago.

3               I would now like to venture into sort of  
4       the nonfinancial aspects, and suggest that we look  
5       at local planning and land use procedures. It  
6       might be desirable to seek statutory change that  
7       will allow some administrative incentives at the  
8       local level when PV incentives are installed on  
9       new homes within the jurisdiction.

10              And these can include such incentives as  
11      CEQA process reform, and I'm not ever suggesting  
12      that we get rid of CEQA or we get rid of CEQA  
13      review for projects. That's never going to  
14      happen; we're not suggesting it. What I am  
15      suggesting is that there's a lot of redundancy  
16      that's going on right now in the CEQA review  
17      process. More importantly, there's a whole lot of  
18      redundant challenges once that CEQA review process  
19      is completed at the local level.

20              This can stand as an obstacle to the  
21      moving forward of a project for years. It's not  
22      uncommon to see large scale projects spend eight  
23      to nine years in a local planning and land use  
24      procedure. Most of this is involved with the  
25      environmental review and environmental impact.

1                   Certainly a lot of the redundant, the  
2                   same issues that are challenged time and time  
3                   again on the same project, if there's some way to  
4                   somehow encapsulate these into singular procedures  
5                   and allowing the project to move forward in a  
6                   quicker fashion once these are resolved, certainly  
7                   it's to everyone's benefit.

8                   But that's also a huge financial  
9                   incentive for the developer. Because right now  
10                  sitting on a project for an extra two to three  
11                  years has obviously financial consequences.  
12                  Expediting local land use and permitting  
13                  approvals.

14                  Forgetting about CEQA, there's a host of  
15                  other things that have to occur, as well, all the  
16                  way down to plan check and inspection. It's plan  
17                  check and inspection where we've been able to get  
18                  the largest amount of benefit for seed programs.  
19                  Unlike up in Rocklin where they already have plan  
20                  check down to about ten days, they can't really  
21                  cut it down any more as far as an incentive for  
22                  builders. But in southern California we got  
23                  jurisdictions that are taking five and six weeks  
24                  to do initial plan checks. They were doing  
25                  redundant plan checks. And then inspections, they

1       were giving sort of a prioritized service if you  
2       join the seed program.

3               Obviously that can occur, as well. If  
4       all of a sudden, after you've broken ground,  
5       you're ready to move forward, after the utilities  
6       have been installed, if you can cut two to three  
7       weeks out of a process that is money. That's  
8       financing that doesn't have to sit there, just  
9       burning a hole in the developer's overall cash  
10      flow. And it's very advantageous.

11             Lot density increases, this would be  
12      desirable in those circumstances where the local  
13      jurisdiction has placed a density limit on the  
14      given development that is less than that desired  
15      by the landowner and developer. This doesn't  
16      happen all that often. Obviously high density  
17      housing is environmentally friendly, particularly  
18      close to transportation corridors. The fact of  
19      the matter is some jurisdictions do place  
20      unreasonable and somewhat unfounded restrictions.  
21      And if somehow that is able to be increased even  
22      slightly you've just completely paid for the  
23      photovoltaic arrays on every house.

24             Local fee reductions. Across the state  
25      and local cities and counties are commonly

1 charging tens of thousands of dollars in local  
2 fees related to such infrastructure items as  
3 schools, parks, waters, sewers and  
4 transportations. The Department of Housing, about  
5 three years ago, put together a report and I've  
6 given you the executive summary. It's called pay  
7 to play.

8 And this sort of capsules what's  
9 happened in California, in San Diego, in Silicon  
10 Valley and in major portions of the L.A. area, it  
11 is not uncommon anymore to see a jurisdiction  
12 charging in excess of \$100,000 in various fees to  
13 make up the cost of things that Prop 13 has kind  
14 wrought upon us.

15 The statewide average as this report  
16 indicates is somewhere around \$25,000 to \$35,000  
17 depending on whether it's multifamily or single  
18 family housing. But that also includes the  
19 averaging in of those jurisdictions that don't  
20 have production housing going in that really  
21 aren't charging any fees at all.

22 So once you move away those  
23 jurisdictions that are charging zero, all of a  
24 sudden it's very very common, even here in  
25 Sacramento, to see jurisdictions charging in

1 excess of 50 grand per house before ground is ever  
2 broken, just on the local fees.

3 If somehow the local jurisdiction could  
4 be encouraged to look at those fees and to maybe  
5 calculate them more accurately. Because right now  
6 it seems that sometimes a dart board is used to  
7 come about with some of these figures. Many times  
8 a jurisdiction will look at what the next  
9 jurisdiction is doing and say, well, we need to  
10 charge that or we'll add \$500 to that because we  
11 have greater needs than they do.

12 There's very little scientific basis  
13 right now used to calculate most of these fees,  
14 other than arriving at some ballpark figure and  
15 slapping it together and charging the builder. If  
16 perhaps they could be more labored in their  
17 ability to calculate what they accurately need,  
18 that could help and be used to offset the cost of  
19 the PV system.

20 Energy efficiency mortgages. That's  
21 already been mentioned by several representatives  
22 today. But the problem here is though we're very  
23 supportive of this and the lending institutions  
24 tell us they're very supportive of this.  
25 Unfortunately it's greatest benefit is in further



1 energy efficiency items. As far as photovoltaics  
2 go, that's a different story. The lending  
3 institutions are not thrilled at all about the  
4 example of paying \$150 a month to save \$50 a  
5 month. That's why they haven't embraced using the  
6 energy efficiency mortgages for this, for  
7 photovoltaics.

8 But still, such types maybe state, use  
9 of PERS money, who knows, in terms of upfront  
10 grants to be paid back over a period of time.  
11 That could be incorporated. Who knows. There's  
12 any number of things to look at in terms of  
13 mortgage assistance.

14 Inclusionary zoning, more and more local  
15 jurisdictions are requiring for builders to meet  
16 affordable housing mandate by taking an arbitrary  
17 number, say 5 or 10 percent of all units in an  
18 existing or a proposed phased project will be low  
19 and moderate income housing. And the 10 percent  
20 of those units, the low and moderate income  
21 housing units, will be offered at a certain rate.  
22 And they can't be offered at a rate higher than  
23 that.

24 Now, what the builder does to make up  
25 for that is simply increase the cost of the

1 remaining nine units out of the ten. And in some  
2 cases, depending where you're at, if you're in  
3 Silicon Valley, that could be increasing the cost  
4 of your home anywhere from \$50,000 to \$100,000,  
5 depending on where you're building. That's a huge  
6 problem.

7 Also we've got a number of studies to  
8 show that this is not providing the amount of low  
9 and moderate income housing that the state  
10 desires, and that the local jurisdiction desires.  
11 It's sort of a failed attempt at resolving this.  
12 However, certainly there's better things the money  
13 could be spent on. Obviously, this may be one of  
14 them.

15 In terms of liability protection, I'd  
16 like to state this really isn't an incentive, more  
17 something that absolutely has to happen. It was  
18 mentioned before that the inverter doesn't have  
19 the same life cycle as the panels and other  
20 things. This is a big problem. If you've got an  
21 inverter that's lasting anywhere from five to  
22 eight years, as opposed to 15 to 20 years for the  
23 panels on the roof, this creates what we call a  
24 construction defect problem.

25 You've got a ten-year manufacturer's

1       warranty and a ten-year warranty on the house here  
2       in California. This is obviously going to run  
3       afoul of that. And the consumers aren't going to  
4       like it at all. And obviously, just as we have a  
5       lot of sun, California also boasts a huge array of  
6       trial lawyers throughout the state. This is the  
7       single biggest issue that the building industry  
8       has had to confront over the last five years,  
9       construction defect litigation.

10               It all but drove multifamily  
11       condominiums out of the state for about an eight-  
12       year period. We're just now becoming more vibrant  
13       in that area again. And we need to address it and  
14       we need to focus on these problems on the front  
15       end, and address them now. Otherwise, it could be  
16       a bit of a disaster for the PV market, rather than  
17       the benefit down the road that we see.

18               The last item before I get into a few  
19       general comments is the energy efficiency  
20       compliance credit. I'd like to point out that I'm  
21       only bringing this up because it's been plugged  
22       into Senate Bill 1653 or 52 by Senator Murray. It  
23       has been suggested by some in the Legislature that  
24       the Energy Commission should modify the  
25       residential energy efficiency standards to allow

1       for some amount of partial energy efficiency  
2       compliance credit that could be used when a PV  
3       system is installed.

4               Off the front end we think, at least for  
5       the short term, this is a bad idea. The energy  
6       efficiency standards have been proven, even by us,  
7       and we use very stringent requirements when it  
8       comes to cost effectiveness, the energy efficiency  
9       standards that you adopt are cost effective to the  
10      homebuyer.

11             Right now we wouldn't want to see any  
12      type of watering down of that. I could perceive,  
13      once the PV market has sort of settled down and  
14      matured, that it could somehow be incorporated  
15      into the overall building standards of the Energy  
16      Commission's efficiency regulations. But I think  
17      it's way too soon, and I think it could end up  
18      being a disaster if we tried to do it now. We're  
19      very opposed to that, and I know that a number of  
20      environmental groups and others are opposed, as  
21      well.

22             Lastly, --

23             PRESIDING MEMBER GEESMAN: I think that  
24      would probably arouse quite a bit of hostility  
25      from my colleagues.

1                   MR. RAYMER: I hear you, and we're not  
2           proposing it. The fact is it's in the bill right  
3           now, so we thought we'd speak to it. At least,  
4           you know from the short term it's a bad idea.

5                   Okay. Having said that, some general  
6           observations. As I mentioned, at the front end,  
7           as soon as the financial subsidies disappear, so  
8           does the consumer demand. The construction  
9           industry experts have indicated that short term  
10          the labor force doesn't yet exist for any type of  
11          a significant mandate.

12                  Right now we're doing about .75 to 1  
13          percent of our residential homes this year with  
14          photovoltaics. If there's to be a 5 or 10 percent  
15          mandate effectively overnight, by 2006, you're  
16          going to need a qualified workforce to do that.  
17          Today's roofers, today's electricians aren't  
18          trained. This is a disaster awaiting. We've seen  
19          this happen before. And it also sets up a  
20          problem, the last thing you don't want to do is  
21          create a delay in the flow of construction and a  
22          delay in that opening of the house.

23                  With new construction today you've got  
24          people waiting to move into that house as soon as  
25          you get your final occupancy permit. You're not

1 basically showing 500 empty homes to potential  
2 homebuyers. People are going to models; they're  
3 basically picking which model they want; they're  
4 shown the lot; and then they're told come back in  
5 about four to five months, okay.

6 The problem here is when they come back  
7 in four to five months and the house is delayed  
8 for another three weeks, I'm seeing visions of  
9 people with pitchforks and torches going around  
10 the foreman's trailer saying, what is going on  
11 here. And the fact that they have an inability to  
12 have easy access and free access to a qualified  
13 labor force to do these installations in a  
14 competent fashion, that could be a huge problem  
15 that we could run into.

16 I've already spoken to the inverter  
17 problem. We need to address that. To the extent  
18 that the manufacturers can somehow develop a  
19 warranty and replacement proposal, certainly these  
20 are options that are open to us.

21 Application issues with local  
22 government, and this is in terms of the mandate  
23 problem, the Senate bill that's out there right  
24 now doesn't seem to address a host of local  
25 logistic problems that are going to be coming up.

1                   Number one, it's an unfunded state  
2                   mandate. You're going to be depending on city and  
3                   county building departments to enforce this.  
4                   There's a question if it's a percentage issue,  
5                   where, when, who's in charge, performance  
6                   requirements. All of these are issues that are  
7                   dealt with in the building standards that the  
8                   building departments will enforce through every  
9                   other component of the house.

10                   There's a host of issues that need to be  
11                   resolved here. For example, if I've got a five-  
12                   phased project, I'm going to have 500 units, 100  
13                   units in each phase, and I'm going to be building  
14                   out over the next anywhere from four to eight  
15                   years, depending on how quickly they sell.

16                   Do I go ahead and -- I've got a 10  
17                   percent mandate; do I put them all in the first  
18                   phase and have none in the rest? Is it evenly  
19                   scattered out? When and where do I put these in?  
20                   These are issues that will have to be addressed.  
21                   Is the builder in charge; is the local  
22                   jurisdiction in charge; and who's in charge. That  
23                   needs to be spelled out so that later on you're  
24                   not going to have a bit of a local war going on  
25                   between the developer and the local jurisdiction.

1                   And certainly the performance  
2           requirement, what standard the inverter and the  
3           system as a whole meets is going to be very  
4           important for the homebuyer.

5                   As has always been mentioned, the  
6           incentives, we're looking at long term, not three  
7           or four months. We're looking at things that will  
8           last for a couple of years so they can be  
9           competently developed into the production cycle of  
10          today's production home builder, if you want  
11          massive application.

12                   They have to be able to depend on the  
13          package of incentives, whatever they be, that  
14          they're going to be around for a couple years.  
15          Otherwise, pull the rug out, all of a sudden you  
16          have a bit of a -- you have a very obvious  
17          problem.

18                   And once again, back to our BI program,  
19          in conclusion, the benefit of the carrot approach  
20          as we did with our BIC program is that one or more  
21          pilot programs, in the case of PVs, is that the  
22          participants, the local jurisdiction, the  
23          manufacturers and the builders all want to be  
24          doing this. And when you have a group of people  
25          who all want to meet a common goal they're going



1 to work together to take care of problems that pop  
2 up. They'll work out the bugs over time. And in  
3 working out those bugs will be able to come back  
4 and develop maybe something on a statewide basis  
5 for a long-term goal.

6 But right now we need to take this  
7 fledgling industry and get it applied in ways that  
8 it's going to take a lot of people with a strong  
9 desire to get the job done right.

10 So, with that, that's the conclusion of  
11 my comments. I'll certainly be back for the  
12 afternoon session.

13 PRESIDING MEMBER GEESMAN: Thanks, Bob.

14 (Applause.)

15 MR. TUTT: Next if we could hear from  
16 Mark Robinson from NEXTEK.

17 MR. ROBINSON: Thank you. My  
18 presentation is three to five minutes long. I'm  
19 Mark Robinson from NEXTEK Power Systems. Grid  
20 interconnection usually refers to an inverter  
21 which sends un-used power back into the grid.  
22 Grid interconnection, which is a method of energy  
23 storage, is required for rebates and support from  
24 the CEC because we don't want to rebate offgrid  
25 systems.

1           I'd like to suggest that we broaden the  
2       definition of grid interconnection a bit. All  
3       forms of energy storage are expensive or  
4       inefficient, so the most efficient method to  
5       maintain a locally generated energy system may be  
6       to use it all where and when it's generated.

7           To do this, though, we don't necessarily  
8       need to invert to ac. Commercial buildings  
9       contain a great deal of dc compatible loads, like  
10      lighting, for example. Other loads include  
11      telcom, servers, things like that.

12           Here's how a system like this works.  
13      Functionally during the day we're seeing here that  
14      almost all of the lighting load is being provided  
15      by the PV with a little bit being provided by the  
16      grid, which is converted to dc.

17           Of course, when clouds come over it  
18      pulls more from the grid and less from the PV. At  
19      night, of course, it's all grid.

20           So with this kind of system what we're  
21      doing is we've got a hybrid system that's a dc  
22      system in the building.

23           An interesting side effect is during a  
24      power failure where most inverters are required to  
25      shut down, this system can continue to provide

1 power to the load.

2 So what I'd like to suggest is that we  
3 broaden the definition of grid interconnected to  
4 include systems that must be connected to the  
5 grid, indeed, but do not necessarily feed back  
6 into the grid.

7 Thank you.

8 (Applause.)

9 MR. TUTT: And finally our last  
10 presenter officially I think today before we break  
11 for lunch is Mike Bergey to talk about small wind.

12 MR. BERGEY: Thanks, Tim. I did provide  
13 some notice that I wanted to speak, but apparently  
14 it didn't make the list. I do have a number of  
15 slides and am mindful that my time has already  
16 expired. And so I will go through those very  
17 quickly. Most of the slides relate to really  
18 naked boosterism for the technology I've worked on  
19 for 25 years. I think you can all safely assume  
20 that I'm an advocate and thing we ought to be  
21 doing more of it. So I'll just go through those  
22 very quickly.

23 But there are some things. Of course,  
24 people want alternatives, we know that. They like  
25 renewables, you know that. Modern wind turbines,

1 two things about that. They're high tech and  
2 American companies are the worldwide leaders in  
3 technology and market share. That's not true of  
4 all renewables.

5 They do compete well at this point  
6 against the solar alternatives. Of course, in  
7 terms of places you can use wind power we're more  
8 limited. But we do have a very good shot at  
9 affordability in the future. We do see lots of  
10 room to bring costs down.

11 The major market is rural residential,  
12 right now about an acre of property, typically 5  
13 to 15 kW wind turbines, in the range of \$45,000 to  
14 \$60,000, no batteries, connected to the grid.

15 My company is the leading supplier of  
16 those products worldwide. And we have the only  
17 direct grid intertie system in the CEC program.

18 Typical customers have an acre of  
19 property, more sizeable utility bill, live in a  
20 good wind area and have a state subsidy program.  
21 I apologize for the aerial shot from the State of  
22 New York, but I didn't have any aerials from  
23 California.

24 Who's it going to be tomorrow? Well,  
25 don't hold your breath. You just may see building

1 integrated wind turbines, smaller lots, weaker  
2 wind resources. And I do think that wind does  
3 have the possibility of getting, within our  
4 lifetimes, in fact within a few years, we hope,  
5 the Holy Grail, monthly payments that are equal to  
6 the utility bill savings. The point that we'd all  
7 like to reach.

8 The U.S. market potential is very large,  
9 A.D. Little, Department of Energy, the American  
10 Wind Energy Association have all taken a look at  
11 this, and there are a lot of homes on an acre or  
12 more of property, even more on half-acres, and a  
13 lot of usable wind resources. So the potential is  
14 quite reasonable.

15 The American Wind Energy Association  
16 also has done a roadmap and they've set a goal,  
17 although an overly ambitious one I'm willing to  
18 admit, of 5 percent of residential electricity by  
19 2020. But that's a useful touchstone document.

20 Of course, small wind is well behind the  
21 other, if you will, mainstream renewable  
22 technologies and fuel cells. We just haven't had  
23 the investment that other technologies have had.

24 And the reason why you don't see more  
25 wind turbines around, small wind turbines, is that

1 the equipment costs too much; we don't produce  
2 enough of them, and we haven't had the sort of  
3 focused subsidies. We have the very best subsidy  
4 support program right here in California. So  
5 you've certainly done your part, but others have  
6 not.

7 And then the permits. The ubiquitous  
8 35-foot height restrictions that we're having to  
9 battle. And California's been the worst for that.

10 What's the industry doing about the  
11 cost? We're using technology to lower costs and  
12 we're increasing production rates to drive down  
13 costs. Our vision is wind as a new age home  
14 appliance, a ceiling fan on steroids.

15 Now, let's go to California. These are  
16 typical installed costs. And my presentations  
17 were outside, and I've got more copies if  
18 necessary. Typical costs are in the \$45,000 to  
19 \$60,000 range. The reason for the range there are  
20 different tower options, and some of the prettier  
21 towers, of course, cost more to install.

22 The question has been asked, is there  
23 enough small wind potential in California to  
24 justify messing around with the technology. Just  
25 to take another cut at that, there's about 24

1 million acres in California, about 24 percent of  
2 total land mass that has a class 2 wind resource  
3 or better. 1.8 million acres of that are  
4 particularly prime for small wind. And if you add  
5 together the top 200 zip codes and do a property  
6 sort and start looking at penetrations, you can  
7 identify approximately 400 megawatts of potential  
8 capacity in just part of the market.

9 The prime wind areas are Solano --  
10 market areas are Solano County, Antelope Valley  
11 and Hesperia area. And as you point out, in each  
12 of those there is a regional correlation between  
13 peak loads and wind resource. So they are peak  
14 shaving.

15 The most active market areas, Hesperia  
16 about 45 ten-kilowatt wind turbines within a ten-  
17 mile radius. And that's because of relaxed  
18 permitting in San Bernardino County. And we've  
19 just hit the market tipping point. We've broken  
20 through on the barbecue circuit. And so now  
21 neighbors are selling to neighbors.

22 And you can see some of the stuff here.  
23 It's gotten to the point where you send five packs  
24 of wind turbines out with 120-foot guide lattice  
25 towers, reducing shipping costs from about \$1600 a

1 system to \$450 per system.

2 But unlike solar, small wind sales did  
3 not take off in 2001, due to the permitting. You  
4 can see the photovoltaic growth curve and the wind  
5 growth curve is starting to come back up, but we  
6 really got in 2001 and 2002, really got knocked in  
7 the shins by permitting.

8 Here's an example. Antelope Valley,  
9 wonderful area for -- this is northern and eastern  
10 Los Angeles County. Eighty quotes over 12 months;  
11 six permits over 12 months. We've got a nine-  
12 month rebate -- had a nine-month rebate validity.  
13 Now it's six months. So, we've had some real  
14 issues.

15 The CEC is helping with that. This is  
16 through the consumer education program, this is a  
17 permitting handbook that was done by the Wind  
18 Association which has been helpful. We also  
19 passed a state law that helps.

20 Here's what we recommend in taking wind  
21 to the next level here in the state. We'd like to  
22 see you leverage more off of new and enhanced  
23 rebate programs in some other states. And do that  
24 by revisiting the rebate levels and the terms to  
25 restore the market stimulus.



1                   We also see a need to extend and upgrade  
2           AB-1207 permitting legislation which expires in  
3           about a year. And we'd like to see some  
4           addressing of the wind property tax issue. Solar  
5           is exempt, wind is not.

6                   Let me run through very quickly a few of  
7           the responses that we had on the questions, the  
8           primary questions that were asked. Of course we'd  
9           like to see some methods to promote permitting and  
10          addressing the property tax. But we also think  
11          small wind can play a particular role in the  
12          concentration on the inland southern California  
13          growth areas for new homes.

14                  We think the model ERP is very good;  
15          certainly agree with all the kind comments that  
16          Jan MacFarland made. We're very appreciative of  
17          the program and the leadership in this building.

18                  Wind did take a bigger reduction in 2003  
19          in the biannual or semiannual declines hit wind  
20          twice as hard due to their lower cost basis. So  
21          we've definitely seen a reduction of stimulus in  
22          the market. We proposed a short-term increase in  
23          the wind rebates that would quadruple sales and  
24          lower prices we project about 17 percent over two  
25          years at a marginal cost to the ERP program of \$4-

1 to \$5 million.

2 And if the funds are exhausted, as  
3 they're now on a trajectory to do, we think that  
4 the manufacturers will survive but many of the  
5 dealers will not. And therefore, the local  
6 support infrastructure will at least weaken, if  
7 not dissolve.

8 In terms of following the rebate or the  
9 reduction model, I think it's been the case in  
10 Germany anyway that a performance-based subsidy  
11 had to be married to a good financing program in  
12 order to keep the stimulus going. So it would  
13 have to be that sort of thing. But we wonder why  
14 really what reason there is to change horses in  
15 midstream. The current program seems to work.

16 There are lessons from -- sorry, I did  
17 this very late last night; had to leave for the  
18 airport very early; so I meant to say it is  
19 unfortunate the U.S. Government --

20 (Laughter.)

21 MR. BERGEY: -- but I didn't make it.  
22 That didn't get edited out. My apologies for  
23 that. But the lesson is that if you or a  
24 government goes after a strategic market and  
25 captures the lion's share of that, it does create

1 the manufacturing competitive advantage, and  
2 concentrates the jobs in your domain. So there's  
3 strategic reasons to go after these advanced  
4 energy technologies.

5 In terms of net metering I probably  
6 disagree with many of my solar colleagues. Our  
7 view is that net metering is really just a second  
8 or third tier incentive. Shouldn't be given a  
9 priority over rebates, tax credits and tax  
10 exemptions in terms of what it does to payback  
11 period, and therefore stimulus, it's just not that  
12 important.

13 And the utilities have a number of good  
14 reasons in administrative cost savings to give you  
15 net metering anyway if they're not required to.

16 CRS exemption we also think is a  
17 wonderful thing, but we're not sure it needs to be  
18 permanent. Maybe if it just covered the probable  
19 payback period, since most homeowners don't really  
20 look at the life cycle energy costs of the system.  
21 They really care about the payback. And so after  
22 it's paid for they might be willing to give some  
23 money back.

24 And we like -- customers like tax  
25 credits, and so we'd like to see those extended.

1       Our most -- what we feel is most likely to happen,  
2       we expect to get an energy bill by the end of this  
3       month through the Congress, or tax provisions.  
4       What's most likely been there for photovoltaic and  
5       small wind is a 15 percent credit cap to \$2000.  
6       So it's not like the federal government won't be a  
7       huge player in stimulating the market.

8               Of course we would like to see the  
9       Governor say both solar and wind, but we think in  
10      general just allowing more consumer choice is a  
11      good thing. And so any programs that would be for  
12      one, we'd like to see cover multiple technologies.

13             And we think that mandated financing  
14      availability structured with a modest buy-down so  
15      that you can balance the monthly cash utility  
16      savings against the mortgage increment could work  
17      more effectively than mandates.

18             And we also think that it's worth taking  
19      a look, even though it would hurt my business, it  
20      would hurt the solar installers' business, the  
21      European model has been quite successful in  
22      putting -- in getting homeowners involved with  
23      renewables by allowing a bunch of them to go  
24      together and cooperatively own a larger renewable  
25      system that's sited where it's convenient to site

1       it. But the utilities are required to credit  
2       their proportional share of the production from  
3       that large wind turbine, for example, against  
4       their homeowner's utility bill. And then, of  
5       course, don't forget the existing homes.

6               Thanks, I don't know how long that took,  
7       but I did try to go through it as quickly as I  
8       could. I appreciate your --

9               PRESIDING MEMBER GEESMAN: Thank you,  
10      Mike.

11              (Applause.)

12              PRESIDING MEMBER GEESMAN: Why don't we  
13      come back at 2:15.

14              MR. TUTT: That sounds good to me.

15              PRESIDING MEMBER GEESMAN: Great.

16              (Whereupon, at 1:15 p.m., the workshop  
17      was adjourned, to reconvene at 2:15  
18      p.m., this same day.)

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AFTERNOON SESSION

2:20 p.m.

PRESIDING MEMBER GEESMAN: What we're going to do before we start the roundtable, though, is to offer anybody that has given me a blue card the opportunity to address the group separate from the roundtable. And the first person to do that is Don Osborn.

MR. OSBORN: Well, good afternoon; thank you very much. I appreciate the chance to go right away as I do have to depart shortly.

I'm Don Osborn; I'm the CEO of Spectrum Energy, a solar provider here in California. I'm also the Director of the American Solar Energy Society Policy Committee. And I'm the former Superintendent for Renewable Resources at SMUD. started up the SMUD solar program and ran that until my departure about two years ago.

I'll keep my remarks very short, and just want to emphasize one major point. We have an exciting, potentially revolutionary suite of opportunities coming up here in California for solar and renewables development with the initiatives being discussed and being pushed by the Governor's Office.

1                   However, we've got good news and bad  
2           news. The good news is the California renewables  
3           program has been world class. It has definitely  
4           made California one of the top three important  
5           markets in PV in the world. And I know that the  
6           results have far exceeded any expectations; in  
7           fact, that's part of our problem.

8                   The bad news is our success is leading  
9           to a train wreck; and, in fact, that train wreck  
10          is already upon us. I think the cars are just in  
11          the process of crumpling up one behind the other;  
12          maybe that wave hasn't quite caught us. But,  
13          nonetheless, it's there.

14                  The most single important aspect of any  
15          sustainable energy development of public policy is  
16          the sustainability of that public policy. As the  
17          gentleman from GE Energy pointed out repeatedly in  
18          his slides, to be effective the policy, these  
19          incentives, must be sustainable through the entire  
20          period contemplated by both the policy makers and  
21          the industry which is responding.

22                  And, in fact, most importantly that  
23          sustainability must be credible to the investors  
24          behind the manufacturers and the system providers.  
25          Otherwise, the investment in new production, the

1 investment in improvement of delivery systems and  
2 development of new products to respond to that  
3 market will not be made unless that incentive base  
4 is credible for the life of the proposed  
5 incentive.

6 The self generation incentive program  
7 through the PUC, the sister program of the CEC's,  
8 has already caused serious damage with the gap in  
9 funding which currently exists. We submitted, for  
10 example, a couple of commercial reservations a few  
11 weeks ago. We're number 62 and 64 on a waiting  
12 list. We have commercial customers ready, able  
13 and willing to invest in large commercial PV  
14 systems who are being told, well, we really can't  
15 consummate this deal. We don't know if we'll even  
16 be able to do so this year.

17 Far more important than the level of any  
18 rebates or buydowns, far more important than the  
19 details of any program, whether it's a production-  
20 based or an upfront buydown, is the credibility of  
21 that program. And for any new programs to  
22 succeed, they must be built upon the success of  
23 the existing programs.

24 The CEC has done an outstanding job in  
25 addressing the funds issue by ramping down the



1 incentives and by finding ways to stretch out the  
2 money and to find new money to plough into it.  
3 The PUC has not, unfortunately, been that nimble.

4 The CEC, as the state agency with the  
5 broader overview of these issues, I would ask to  
6 do whatever is in your power to help your sister  
7 agencies cope with the problems which exist prior  
8 to implementing any new programs. For those new  
9 programs to be successful we must resolve this  
10 problem.

11 In the presentation that I've given you  
12 I developed this more fully and relate this to the  
13 experiences that we've had in terms of sustainable  
14 orderly development. California is at a turning  
15 point right now. If we can find some way to  
16 quickly resolve the problems that we currently  
17 have with the self generation incentive program,  
18 and avoid similar problems with the CEC emerging  
19 renewables program, then we will be continuing the  
20 success of the California renewable experiment to  
21 the benefit of all citizens in the state. And  
22 will provide a firm foundation to build successful  
23 programs, such as the new housing initiative.

24 So, with that I think I'll end my  
25 remarks and just thank you for your attention.

1                   PRESIDING MEMBER GEESMAN: Thank you.  
2           Sheryl Carter.

3                   MS. CARTER: Good afternoon,  
4           Commissioners. I just want to take a moment  
5           before we start the roundtable discussion to make  
6           some broader, over-arching comments. I'm Sheryl  
7           Carter with the Natural Resources Defense Council,  
8           or NRDC.

9                   We really are at a cross-roads right now  
10          in California in terms of energy policy. We have  
11          the beginnings of a very promising energy policy  
12          for the state that emerged first through an  
13          unprecedented collaborative process between the  
14          Energy Commission, the PUC and the California  
15          Power Authority that put at the top of the list of  
16          resources to meet California's energy needs cost  
17          effective energy efficiency and renewables;  
18          including in that renewable DG.

19                  I think that it's important that when we  
20          talk about this topic we think about it in the  
21          broader policy, or broader context of California  
22          state energy policy.

23                  We definitely -- we heard a lot of  
24          comments this morning about the need for a long-  
25          term sustainable focus for this industry, for

1       these resources. We think that targets are  
2       important, but targets really only work if you  
3       have a plan to get us there. I know that a number  
4       of key folks in the industry are working on such a  
5       plan right now. I think that as we look at the  
6       targets to set, we specifically look at how we're  
7       going to get there and make sure that we have that  
8       in place.

9               Coordination is critical. We need to  
10       continue the incredible coordination that was  
11       begun and that resulted in the energy action plan  
12       between the state agencies with this issue, as  
13       well as the other policy issues in the state.  
14       Coordination is needed in this area between the  
15       programs, but also in determining any new programs  
16       that need to be started.

17              We're talking about new programs here  
18       today. Just adding a new program onto what we  
19       already have without thinking about the whole  
20       context of the long-term plan and how we're going  
21       to get there, I don't think is going to do us much  
22       good.

23              We definitely support performance-based  
24       incentives. We support them in terms of any  
25       resource that we look at for our energy needs, in

1 terms of operating power plants, in terms of  
2 energy efficiency, in terms of demand response,  
3 renewable energy programs, and I think that it's  
4 critical we heard a number of comments today that  
5 we strongly support moving us in the direction of  
6 performance-based incentives in this industry.

7 Another thing that I wanted to address.  
8 Oftentimes it's frustrating to see energy  
9 efficiency pitted against renewable energy, when,  
10 in fact, they're necessary for each other. As I  
11 mentioned at the beginning of my comments, our  
12 energy action plan for the state puts energy  
13 efficiency and renewables at the top of the list  
14 before anything else.

15 A number of folks have recognized this  
16 today, and I think in developing our policies we  
17 need to really think carefully about it. PVs will  
18 be successful only to the extent that we maximize  
19 energy efficiency in homes.

20 And also I believe that there are some  
21 opportunities to leverage the programs, the energy  
22 efficiency programs, and the PV programs, with new  
23 homes in a way that we haven't really looked at  
24 yet. And hopefully we can talk about some of  
25 those ways today.

1                   In terms of the questions that were  
2                   asked in the notice, we agree with most of the  
3                   parties today that PVs should never qualify for  
4                   compliance credits in meeting building energy  
5                   efficiency standards under title 24, because I  
6                   think that does damage to the PV industry and the  
7                   renewables DG industry in general in the long  
8                   term. And I was happy to hear most people agree  
9                   with that today.

10                  We think that it's possible to have a  
11                  package of an energy efficiency home that  
12                  significantly exceed's title 24 standards, and  
13                  includes PVs and renewable distributed generation  
14                  in the home; and to have an incentive for those  
15                  developments, leveraging both the PV funds that  
16                  are available as well as the energy efficiency  
17                  funds that are available without needing to talk  
18                  about cross-subsidizing between the two, but  
19                  leveraging them and making sure that the cost  
20                  effectiveness calculations take into account the  
21                  whole package instead of looking at them as  
22                  separate pieces of the building puzzle.

23                  Because that will, I think, I'd like to  
24                  explore that more, make PVs look a lot more cost  
25                  effective and a lot more do-able to the homeowner

1 in the long run. So I'm hoping that we can look  
2 at some of these packages.

3 Another issue that was brought up really  
4 only briefly today was solar water heaters and we  
5 believe that there's some opportunities here  
6 leading to bulk purchases, lowering the costs,  
7 addressing our natural gas issues, which is  
8 another energy issue that we need to deal with in  
9 this state. As well as addressing the challenge  
10 of multifamily home developments.

11 So, we look forward to the discussion,  
12 thank you.

13 PRESIDING MEMBER GEESMAN: Thank you.  
14 Now I'm simply going to read off the remaining  
15 blue cards I have and determine if anybody wants  
16 to address us all before the roundtable or not.  
17 Vince Schwent. Is Vince still here? Jane  
18 Turnbull.

19 MS. TURNBULL: Commissioners, I'm Jane  
20 Turnbull. I'm here on behalf of the League of  
21 Women Voters of California.

22 I have many similar things to say that  
23 our previous speaker spoke to, but perhaps we come  
24 at it from a slightly different perspective. We  
25 also are very enthusiastic about the collaboration

1       between the PUC and the CEC and what has happened  
2       in terms of development of an energy action plan  
3       that looks comprehensively at the issues  
4       statewide, and looks into the future.

5               We also look at this particular issue  
6       today as really a part of a continuum of issues.  
7       You know, it really relates to the overall  
8       renewables program; it also relates to the  
9       distributed generation program. And I don't think  
10      it ought to be set apart and treated as an entity  
11      by itself, but is part of that continuum.

12             We also want to point out that the  
13      overall goals of what we're about today really  
14      look at reducing our reliance on fossil fuels and  
15      reducing the negative environmental and political  
16      impacts of fossil fuels.

17             We also want to point out that we are  
18      interested in maintaining the reliability and  
19      safety of our energy system overall. The need for  
20      consistency in what comes out of today's  
21      deliberations is extremely important. I think the  
22      example of the hybrid system that was brought up  
23      this morning, the San Diego system, was very  
24      important because it does indicate that PV and  
25      distributed generation really have to be looked at

1 at the same time. And there has to be consistency  
2 in the way that they are going to be dealt with.

3 Therefore, we feel very strongly that  
4 performance standards are the only way to go. And  
5 they have to be based on the actual attributes of  
6 the individual technologies.

7 Therefore, the attributes are going to  
8 have to be monetized. And among the attributes  
9 that we think need to be monetized are the actual  
10 avoided energy costs, the avoided capacity costs,  
11 the avoided transmission and distribution costs,  
12 the cost of standby charges, the cost of  
13 interconnection, the value of voltage stability  
14 and the value of environmental benefits, including  
15 greenhouse gas benefits.

16 And I raise the greenhouse gas benefits  
17 because of a particular experience that I had over  
18 the last several months looking at a system, a  
19 biogas system, to define actually how many or what  
20 the greenhouse gas benefits would be by putting in  
21 an energy system in the context of a statewide  
22 dairy.

23 In fact, the greenhouse gas emissions  
24 were mitigated by a factor of an order of  
25 magnitude. Therefore, you know, the opportunity



1 overall to mitigate both CO2 and methane and also  
2 the nitrous oxides are really very great. And  
3 they deserve a monetary consideration, as well.

4 We're very supportive of net metering,  
5 but we also think that the actual costs and  
6 benefits related to the development of power have  
7 to be encompassed in that.

8 We think renewable energy credits make a  
9 lot of sense, but the potential for raising havoc  
10 early on could be pretty great. So we would  
11 suggest that those be looked at in the context of  
12 different pilot efforts.

13 We see that distributed generation is an  
14 inventory industry and it needs the opportunity to  
15 evolve. It also needs encouragement to evolve,  
16 but not at the expense of a dependable electricity  
17 system or at the expense of a few of our citizens  
18 in the state and at the benefit of others.

19 Thank you.

20 PRESIDING MEMBER GEESMAN: Jane, when  
21 you said that you're in favor of net metering,  
22 does that mean that you're in favor of expanding  
23 net metering where we've run into the cap, or  
24 about to run into the cap? Or is it something  
25 that you feel should continue to be limited?

1 MS. TURNBULL: I don't sense any reason  
2 for any limitations, both in terms of the cap or  
3 in terms of the limits right now in terms of, you  
4 know, the capacity of the individual systems.

5 PRESIDING MEMBER GEESMAN: Okay, thank  
6 you. Joe McCabe.

7 MR. McCABE: Thank you for the  
8 opportunity to speak today. First I want to thank  
9 the Energy Commission for my ability to help PV be  
10 more market oriented with building-integrated  
11 photovoltaics, as well as my other renewable  
12 project activities in PIER renewables. I feel  
13 like the luckiest guy, and I'm most fortunate to  
14 have worked here for the last three and a half  
15 years. Today I represent Energy Ideas.

16 I hope to bring some vision to your  
17 quest in continuing the great successes from the  
18 emerging account as well as other opportunities  
19 for PV to supply solutions for investor-owned  
20 utilities in California.

21 I need to disclose that I am a stock  
22 owner of Sempra, PG&E and Edison. One share each.

23 (Laughter.)

24 MR. McCABE: I think of it as a lifetime  
25 subscription to the annual reports and the ability

1 to attend the stockholders meetings.

2 Semptra seems geared towards LNG. And  
3 SCE is attempting to spend more than \$900 million  
4 of ratepayer money on steam generator replacements  
5 at San Onofre. PG&E is also seeking preapproval  
6 for investments in excess of \$700 million for new  
7 steam generators at Diablo Canyon. Both utilities  
8 hope to change out the steam generators in the  
9 2008/2009 timeframe.

10 All these IOUs seem to be increasing  
11 threats of terrorist activities and are increasing  
12 geopolitical stresses shipping LNG around the  
13 globe. As Bruce Vincent of SMUD says, California  
14 continues to be one drought or one natural gas  
15 shortage away from its next energy crisis.

16 Hopefully my discussions will help  
17 recognize the value of photovoltaics as a  
18 distributed resource which can help to solve some  
19 of the energy issues California is facing. Amory  
20 Lovins can help you with the DG value. My chapter  
21 in advances in solar, along with Kristy Herig and  
22 Tom Hoff, discusses solar's value accruing to  
23 customers, businesses, utilities and government  
24 agencies with values that are not mutually  
25 exclusive but complementary.

1                   I have a section in here about why BIPV  
2           instead of ground-mounted systems, but Steve  
3           Heckeroth discussed that a little bit. If you  
4           want, refer to his slides.

5                   So I've got about eight bullets here  
6           that are awareness opportunities to increase BIPV  
7           solar electricity in California. I happen to be a  
8           city planning commissioner in a town that has  
9           experienced a lot of pressure for growth. And  
10          I've noticed that -- and here's the suggestion,  
11          Cal/EPA can work with mitigated negative  
12          declarations to require solar on new homes in such  
13          communities where developers do not perform full  
14          EIRs.

15                  Allow IOUs to obtain renewable portfolio  
16          standard credits for grid-connected PV. Sempra's  
17          Robert Resley, VP of strategy and resource  
18          planning, specifically asked for this in a CEC  
19          meeting on zero energy homes.

20                  PV will not be a large megawatt player  
21          in the RPS by 2010, and only will be a player by  
22          2017 if the state continues its commitment to PV  
23          as a DG resource.

24                  PIER renewables has successes from  
25          research and development projects that are giant

1 leaps forward and true aesthetically pleasing  
2 BIPV. Batten Seam by UniSolar, Gecko by GE Energy  
3 Solar Technologies, Sloped Residential by  
4 PowerLight, and RWE Schott Solar's European  
5 systems brought to California. More information  
6 on these are available at [smud.org/pier](http://smud.org/pier).

7 Another project is Endecon's AC Watts  
8 Package Systems evaluations. It's timely to have  
9 this research for potential performance-based  
10 incentives.

11 Imagine working in areas of California  
12 that have grid capacity issues, not power flow but  
13 grid capacity problems. For example, the San  
14 Bernardino and Riverside area is building new  
15 homes at a rate of 43,000 per year. This area has  
16 grid capacity constraints, but has an excellent  
17 solar resource. Zero peaking communities are  
18 possible in the Central Valley.

19 Solar thermal flat plate collectors are  
20 three to five times more effective at converting  
21 solar into useable energy for homes than solar  
22 electric systems. A new sun earth facility can  
23 produce solar thermal collectors at a rate of  
24 50,000 per year located in Riverside. Integrated  
25 collector storage works very well in Central

1 Valley locations with minimal system complexities.

2 What is the price of PV? We heard a lot  
3 today. The graphing shows a shotgun pattern,  
4 which can be as low as \$5 a watt and up. Moving  
5 averages are probably around \$8 a watt,  
6 fluctuating with Y2K, San Diego blackouts and  
7 module price frenzies.

8 California Construction Authority  
9 installs PV for an average of \$4.64 a watt PTC,  
10 accounting for no incentives. This is not apples-  
11 and-apples comparison for typical building-applied  
12 PV. No-leak warranties, no overhead or profits,  
13 no project manager fees. The lowest cost PV is  
14 close to the contractor's shop, a low slope and  
15 easy roof surface.

16 Team Solar has simple designs and low-  
17 cost installation for SMUD. Transaction and labor  
18 costs can be 50 percent of costs. The other 50  
19 percent is hardware.

20 Ten million is available in the  
21 renewable energy program that can be used for  
22 performance-based incentives. Vince Schwent gave  
23 excellent input on this opportunity at the last  
24 workshop. I would suggest that kilowatt hour bids  
25 be performed similar to the way the renewable

1 energy program administers new and existing  
2 accounts.

3 Leadership at the CEC where the  
4 efficiency, renewable energy program and PIER work  
5 together to drive the lowest energy using  
6 buildings to have energy-generating surfaces in  
7 places that grid is optimized and strengthened.

8 Climate-based efficiency HVAC, solar  
9 electric and solar thermal systems, installed  
10 during new construction. Three RD&D sections have  
11 great foundations on this subject, buildings,  
12 renewables and the energy systems integration for  
13 interconnection issues.

14 Feed-in tariffs allow solar generated  
15 electricity to reap a very large monetary value,  
16 which has increased Germany's PV industry to 300  
17 megawatts per year. This has evolved from various  
18 combinations of low interest rates and feed-in  
19 tariffs.

20 Interestingly, performance-based  
21 incentives eliminates many issues with PV's market  
22 acceptance. Japan has the industrial will,  
23 Germany has the environmental awareness,  
24 California had/has an energy crisis.

25 I will be happy to discuss these topics

1 with anyone interested. Hope this helps your  
2 workshop efforts. Thank you.

3 PRESIDING MEMBER GEESMAN: Thank you,  
4 Joe. J. Seidel. And Ken Nittler.

5 MR. NITTLER: Hello, Commissioners. My  
6 name's Ken Nittler; I'm with Enercomp. Most of my  
7 background actually has to do with the energy  
8 efficiency standards, the building energy  
9 efficiency standards. Although deep in my past I  
10 spent the mid 1980s designing and installing  
11 monitoring systems for tax farms, I mean wind  
12 farms.

13 I want to -- the recent speakers have  
14 been talking way up here and I want to talk about  
15 a few real specific things related to your  
16 question number six and in your attachment B.

17 And I want to start off by disagreeing a  
18 little bit with some of the earlier speakers that  
19 I believe that including PV systems in the  
20 building energy efficiency standards is, in fact,  
21 a good idea. I do have some qualifications,  
22 though.

23 In no particular order, just a couple  
24 things I think most people here probably  
25 understand. But I happen to also have a PV system



1       that was gratefully paid for with a \$450 per watt  
2       incentive, or in part. And from that practical  
3       experience, coupled with working on implementing  
4       the building standards, I think I just have a few  
5       things I want to share with you.

6               First of all is that the evidence  
7       suggests that PV systems significantly under  
8       perform compared to their ratings. Now, I also  
9       worked in other areas, especially related to  
10      rating window products. And as I go on in my  
11      career I find more and more cases where the rating  
12      systems that we hinge our decision making on  
13      sometimes don't quite tell the whole picture.

14             And the story I have on that is I just  
15      finished installing my 2400 watt worth of panels  
16      in a system that the CEC provides a rebate for  
17      2000 watts, and I had the installer say to me,  
18      wow, I have never seen a system of this size put  
19      out 1600 watts.

20             So, here's the system getting incented  
21      at 2000 watts, and it's putting out 1600 on a  
22      beautiful, clear, relatively cool fall day. So,  
23      I'm reminded that last week The Bee had an article  
24      on hybrid vehicles where they're saying that, you  
25      know, consumers are turning out to be kind of

1       bummed when they buy this hybrid and it says it's  
2       supposed to get whatever it is, 55 miles per  
3       gallon, and they're getting 20 percent less.

4               And I think whatever happens here the  
5       Commission should use its influence to assist the  
6       PV industry in getting more realistic ratings.  
7       Because ultimately consumers will be dissatisfied  
8       until they get an accurate picture of what they're  
9       buying.

10              Another issue that is perhaps more  
11       unique to PV systems than some other types of  
12       systems has to do really with maintenance. PV  
13       systems are incredibly susceptible to problems  
14       related to things like dirt and shading. Haven't  
15       heard too many speakers today talk about say  
16       shading from landscaping, what that does over  
17       time.

18              There's some issues of long-term energy  
19       performance, some people were testifying to that,  
20       that I think are pretty unique to the way PV  
21       systems work. I mean things like penetration for  
22       plumbing. An innocent plumber who comes in after  
23       this beautiful expensive PV system is installed  
24       and sticks some sort of plumbing vent and could  
25       block one cell of a panel and knock out 80 percent

1 of that array's performance. So there's some real  
2 issues related to installation that aren't similar  
3 to other products.

4 I think both of those discussions really  
5 are reasons that when it comes times to put a  
6 dollar value on it, as the previous testimony  
7 talked about, we really have to discount the  
8 output of these systems to be realistic in a very  
9 big way.

10 One of the other things I've found as a  
11 PV owner that was mentioned by some previous  
12 testifiers has to do with the feedback that you,  
13 as a user or an owner of a PV system, gets. And  
14 the answer is you get almost none.

15 Even somebody like myself, who's pretty  
16 well engaged in paying attention, about a year  
17 after installation my inverter went out. And it  
18 happened to go out completely dead during  
19 Christmastime when it's cloudy and output is very  
20 low anyway. And I'm not generally outside near  
21 the inverter where you hear a fan, you know,  
22 that's like the only sound you hear from the  
23 system.

24 So even somebody like myself, who's  
25 paying attention, it took a month to figure out

1       that the system was dead. And then it took  
2       additional time to get that inverter replaced.

3               I think that as a condition for credits,  
4       or as a condition for recognition in incentive  
5       programs, I think as a condition for recognition  
6       perhaps in building standards, that the PV  
7       industry has to be asked to produce and provide  
8       more meaningful displays in monitoring equipment  
9       that homeowners can tell how their systems are  
10      doing.

11             I don't have explicit suggestions on  
12      that one, but something more than what's being  
13      provided out there would be good public policy, in  
14      my opinion.

15             I'm especially worried as homes turn  
16      over. If we're talking about moving a program out  
17      into production homes, maybe Bob Raymer can tell  
18      me what the average length of stay is, but for  
19      years I've heard people quote seven years in a  
20      house.

21             The first-time owner pays for the system  
22      and is probably paying attention to some extent.  
23      But as you move into second and succeeding  
24      homeowners their interest in keeping these systems  
25      running will probably diminish. And I think there

1       should also be significant requirements related to  
2       homeowner documentation.

3               And even trying to think out of the box,  
4       presumably most of these houses, at least in the  
5       near term, are going to get incentives. So  
6       somebody should be keeping a database of everybody  
7       who got an incentive. And every year the  
8       Commission, the utilities, the PV manufacturers,  
9       whatever, should make some kind of attempt to  
10      reach people at these addresses and make sure that  
11      they've done proper maintenance for the last year,  
12      or recommend what maintenance they should be  
13      doing.

14             Because it would be a real crime to pay  
15      the kind of prices we're talking about for this  
16      generation capacity and have it disappear as time  
17      goes on, five, six, seven, ten, 20 years from now.

18             Now, I'm recommending that, in fact, the  
19      framework of working within the building energy  
20      efficiency standards is a good place for PV. I'm  
21      not proposing it as the only solution of how you  
22      might assist moving PV systems out into the  
23      production world. And I'm certainly recommending  
24      that great care should be taken when you establish  
25      what kind of credits, or what kind of calculations

1 are recognized.

2 There are comments that you need to do  
3 energy efficiency first. And I agree with that up  
4 to a point. I think our experience of the last  
5 20-plus years of the building energy efficiency  
6 standards is that tradeoffs have worked. Builders  
7 and homeowners don't go off and do crazy things.  
8 They do what's cost effective.

9 And I think it would be rare that you'd  
10 find people would completely trade off energy  
11 efficiency measures against generation capacity  
12 because of that cost/benefit issue.

13 So what you could do is something in our  
14 building standards --

15 PRESIDING MEMBER GEESMAN: Let me ask  
16 you there, Ken, --

17 MR. NITTLER: Yeah.

18 PRESIDING MEMBER GEESMAN: -- it's not  
19 the ultimate homeowner that's making that decision  
20 in a new construction context. So, how is the  
21 builder or the architect or designer likely to  
22 draw that tradeoff?

23 MR. NITTLER: Well, I'm speaking in  
24 terms of residential where it's mostly the two  
25 parties that I believe are most important, are the

1 builder and the homeowner. I think, as was  
2 mentioned, probably a lot of these systems that  
3 are installed are going to be at the homeowner  
4 saying, yes, I want to buy this system.

5 So, you'd have --

6 PRESIDING MEMBER GEESMAN: Yeah, but --

7 MR. NITTLER: -- the homeowner buy it --

8 PRESIDING MEMBER GEESMAN: -- if I'm  
9 buying from one of Bob Raymer's tracts, he doesn't  
10 know who I am until I show up to one of his model  
11 homes after the subdivision is already built.

12 MR. NITTLER: Right, but the builder,  
13 because he has to comply with the standards and  
14 has to do some sort of calculation or follow  
15 prescriptive methodologies, is going to have to  
16 make value judgments.

17 PRESIDING MEMBER GEESMAN: Right.

18 MR. NITTLER: I mean I think there has  
19 to be something in this for the builder, as well.  
20 And the answer there to me is in addition to  
21 possible incentives or tax credits, whatever, it  
22 could be credited under the building standards.

23 There are also many instances where  
24 thinking beyond the production builder, or even  
25 the upscale production builders, they're building

1 homes with 30 percent glass that have sometimes  
2 less than desirable orientations. Where  
3 especially under the 2005 standards we've taken  
4 this huge leap to doing time-dependent valuation.

5 Probably, as far as I know, the first  
6 system in the world that looks at something close  
7 to the real cost of peak demand in a building  
8 standard, is going to find cases, especially in  
9 the desert, in the hotter Valley climates, where  
10 the builder is not going to be able to find  
11 features to trade off.

12 And having something like PV recognized  
13 where they could say, okay, I want to build this  
14 house; my customer wants to buy this house; my  
15 customer is willing to pay for PV and maintain it.  
16 I think we need to provide a way for them to get  
17 credit for that in our building standard.

18 PRESIDING MEMBER GEESMAN: But if I  
19 understand you correctly you're focused more on  
20 the custom built house than the production house.

21 MR. NITTLER: I believe my comments are  
22 equally applicable. The comment I just made, yes,  
23 is specific to probably larger custom homes, or  
24 higher end production homes. I mean there are  
25 production homes that go for a million bucks now



1 out there. So this isn't unheard of that this  
2 sort of amenities in terms of window area and so  
3 forth are desirable.

4 In the regular more traditional, call  
5 it, production market, I mean builders, like all  
6 of us in our businesses are pretty much forced to  
7 buy and install and design kind of the least cost  
8 product that our customer is happy with. And  
9 that's the way our economy works basically.

10 And I think by building something into  
11 our building standards that gives them a way to  
12 get some credit in addition to these additional  
13 incentives, that that can provide a reason why  
14 builders would want to pay attention, that you  
15 wouldn't have quite as strong a motivation without  
16 that.

17 A couple angles here that the building  
18 standards, we've already thought about things like  
19 how do you handle subdivisions versus one-of  
20 homes. We have things in the standards that  
21 handle multiple orientations, for example. We  
22 have features in the standards that require a  
23 third-party verification.

24 And I think one strong possibility here  
25 is to integrate this with building standards would

1       be that you do need some sort of third-party  
2       inspection of these systems to verify that they're  
3       being installed correctly and sized appropriately  
4       and all those kind of things.

5               But we have some of those mechanisms in  
6       our standards already. I'm not saying they're  
7       exactly applicable, but they could be a nice  
8       starting point for something that could work even  
9       better.

10              With regards to the orientation, there's  
11       a real problem, of course, that not every home in  
12       every subdivision is going to be appropriate for  
13       PV. Depending on where the roof lines face and  
14       location related to additional or homes, adjacent  
15       homes that have two stories, and whatnot.

16              So, there really needs to be a system  
17       that can automatically or very easily do  
18       performance calculations on these PV systems. And  
19       I'm happy to tell you we've already got the basis  
20       of that. There's some 150,000, 160,000 dwelling  
21       units built in California in a year; 110,000  
22       single family, something like that.

23              And 95 percent of them go through a  
24       computer performance calc. It's not a big leap to  
25       get a performance calc that includes PV from

1       there. Another good reason to think about  
2       integrating with the building standards.

3               Kind of back, one last point and then a  
4       close. Back to something that affects the  
5       homeowner economics that I haven't heard too much  
6       about. It has to do with time-of-use rates on  
7       their actual energy.

8               Because I think one of the big keys  
9       here, in terms of payback to homeowners, is that  
10      they be able to take advantage of time-of-use  
11      rates. And I know this isn't exactly the CEC's  
12      purview, but the way it's set up now it's  
13      something like in PG&E's territory, anyway, on a  
14      net meter thing you can get like 28 cents onpeak  
15      and 8 cents or something offpeak.

16              The dilemma is if you need space  
17      conditioning, for example, you're in a Valley  
18      climate where there's cooling, if your air  
19      conditioner comes on for even an hour during one  
20      of those onpeak times the energy use of that air  
21      conditioner is likely going to swamp the energy  
22      production of your PV system. And so you end up  
23      not really being able to take advantage of time-  
24      of-use rates where you get the higher energy  
25      mostly during the onpeak hours.

1           I think it's a case where somehow we  
2       need to work to devise, invent a better way to  
3       send that signal through the system that says that  
4       energy costs more onpeak, but still provide a way  
5       for distributed generation to cash in, if you  
6       will, on that.

7           I think that's pretty much everything I  
8       want to say. Sort of in close, I really think  
9       that linking this on some level done carefully to  
10      title 24 is, in fact, a good idea. Some of the  
11      benefits, we have a calculation framework that's  
12      run on hundreds of thousands of homes every year.  
13      Dropping PV into that will be reasonable.

14           We have an implementation framework  
15      where we have third-party inspection. We know how  
16      to deal with subdivisions and multiple  
17      orientations and things like that. We have this  
18      incredible bump in that in 2005 we have the time-  
19      dependent valuation scheme that is going to reward  
20      onpeak energy savings by a factor of five over the  
21      current system. It's just huge what it's going to  
22      do to compliance and what benefit it can do for  
23      distributed generation.

24           That's it. Thank you.

25           PRESIDING MEMBER GEESMAN: Thank you.

1       That exhausts my blue cards, Tim. Why don't we go  
2       to the roundtable.

3               MR. TUTT: Any people who gave  
4       presentations or people who are interested in the  
5       discussion just please fill up seats at the table  
6       here and we will get on with talking about the  
7       questions of the workshop in a roundtable format.

8               (Pause.)

9               MR. TUTT: There are some tags for some  
10      of the people that we knew were going to be  
11      speaking today.

12              Okay, Commissioner Geesman, feel free to  
13      break in at any time. I'd suggest that we start  
14      by just talking, since our time is limited  
15      probably this afternoon, briefly about these  
16      questions. I'll start off and just either go  
17      around the table or feel free to break in if you  
18      have a comment or question on these things.

19              The first question we asked was how  
20      about coordination in terms of incentives of the  
21      state and local programs. And we heard some  
22      discussion today about how there's a waiting list,  
23      at least in part of the PUC program. We heard  
24      some discussion today about how the CEC ran out of  
25      money a couple of years ago in its programs. And

1 discussion about how these gaps are problematic to  
2 the industry.

3 And in addition, another coordination  
4 issue is the different in incentive structures  
5 among the programs; in particular, the differing  
6 rebate levels between say our program and the PUC  
7 program, which are the two largest programs. And  
8 the percentage cost requirement in the PUC  
9 program.

10 So, I'd like people to address those  
11 coordination issues if they could briefly in their  
12 comments, and whether if there's anything we can  
13 do about them, or how we should address them.

14 Any --

15 MR. BLAIR: I'll start.

16 MR. TUTT: Okay, Tom.

17 MR. BLAIR: When we try to evaluate a  
18 building for energy projects we'll look at the  
19 whole building. And then try and design in the  
20 energy efficiency, the self generation, all the  
21 components that would be used and could be useful  
22 in lowering the demand for that building.

23 In the recent police headquarters it was  
24 a multiple, I think we had nine energy measures  
25 that we completed in the building under four

1 different programs. So we had separate  
2 applications for SPC; we had separate application  
3 for photovoltaic; we had separate application for  
4 self generation incentive.

5 And then the City does still have its  
6 expedited permitting for energy efficiency  
7 projects and self generation. So, it kind of all  
8 had to come together to do the total project. And  
9 I think nowhere is there a common coordination  
10 where you can go evaluate a whole building. And I  
11 think things are missed that could be really  
12 important energy measures by the fact that we're  
13 doing it in each separate component rather than  
14 looking at the whole building.

15 MR. RAYMER: This is commercial  
16 applications?

17 MR. BLAIR: This is, it could apply to  
18 any. We take every tariff that the utility has.

19 MR. TUTT: Anybody else on that issue?

20 MS. TURNBULL: I think to some extent I  
21 addressed it in my -- I believe I addressed it in  
22 my remarks, but I think if you're accurately  
23 monetizing the real attributes of the component  
24 parts, then you'll have a consistent process that  
25 will allow you to, you know, sort of one-stop shop

1       and not have to go to multiple places.

2               MR. HECKEROTH: I think a really good  
3       example of interdisciplinary working together is  
4       where when the Air Resources Board mandated a fuel  
5       additive that caused groundwater pollution they  
6       didn't check with the Water Board before they did  
7       that.

8               And by having more communication among  
9       the various different state agencies and local  
10      agencies, things like that can be avoided.

11              And also just using the incredible  
12      resources that have been developed by all these  
13      agencies over a long period of time like  
14      EnergyAware from the Energy Commission, and the  
15      Energy Yardstick, which I don't know if these  
16      might be the only copies in existence, I haven't  
17      seen them for a long time.

18              But, to coordinate this -- when I was on  
19      the planning commission in Mendocino County I had  
20      Nancy Hansen, who wrote these documents, come out  
21      and talk to our planning commission. And it was  
22      incredible what it did for our county in terms of  
23      bringing the work that the state has done to the  
24      county level. And empowering the county to move  
25      forward with what it did after she came out and



1       made a presentation.

2               We developed the GIS and GPS capability  
3       so that we could map all the roads in the county  
4       for the first time. And we could start looking at  
5       the various determinants that can be mapped by  
6       GIS. And once you have those overlays then it's  
7       very easy to do the kind of things that need to be  
8       done to have proper orientation of developments  
9       and things like that.

10              MS. MacFARLAND: One of the issues that  
11       is inconsistently applied across the various  
12       jurisdictions is Solar Rights Act. And we do have  
13       a bill, AB-2473, that will apply to all  
14       jurisdictions. And it seems like that may be able  
15       to finally address.

16              We have some counties like Marin County,  
17       they move you to the front of the line. Or like  
18       San Diego County. But then we have counties like  
19       Fresno that make it rather difficult to install  
20       solar. And so we're trying to get a more uniform  
21       application and encouragement of solar across the  
22       board. And we're doing pretty well with even the  
23       county and the city associations. They've been  
24       pretty helpful.

25              MR. RAYMER: Yeah, the problem that

1 Jan's referring to in Fresno, the city was  
2 requiring commercial requirements for access to  
3 large scale facilities on residential rooftops.  
4 And I think that was what, a 36-inch wide corridor  
5 so that you could stand there and operate and  
6 maintain the system. And that was for heavy  
7 industrial access to large-scale cooling towers  
8 and the other.

9 I have no idea why they did that.  
10 There's nothing that really stops them from going  
11 beyond code.

12 MS. MacFARLAND: And I think they don't  
13 allow any tiled roof to have solar, as well.

14 MR. TUTT: No solar on tiled roofs is  
15 becoming a problem in another jurisdiction  
16 recently, too. San Bernardino or something like  
17 that.

18 MS. MacFARLAND: Yeah, San Bernardino is  
19 another one. Martinez. There are a number. We  
20 get, you know, five calls a week.

21 MR. RAYMER: Is that a penetration  
22 issue, or is that a buyer safety issue? What is  
23 it?

24 MS. MacFARLAND: It just depends.  
25 Sometimes it's just a city person that doesn't

1       like it. Other times -- the issue in Fresno was  
2       because someone fell off the roof during a fog.  
3       So, I don't know that there's any one specific  
4       reason.

5               MR. HECKEROTH: It seems to me that the  
6       state could step in in some of these, there's  
7       local agencies and then there's homeowners  
8       associations that can even control solar access.  
9       And that just shouldn't be any more in this day  
10      and age.

11             MS. MacFARLAND: The law that we have,  
12      we have two laws. One applies expressly to  
13      homeowners associations and we can deal with that.  
14      And then the other law that was passed last year  
15      applies to city and counties' access to incentive  
16      money. There is no clear law that applies to  
17      local counties and cities; and that's what we're  
18      trying to change.

19             And I think there's going to be some  
20      more exceptions, but right now it's public health  
21      and safety. And I suspect there might be a few  
22      other things like coastal zone or, you know, with  
23      other things. But it seems to be working.

24             MR. HECKEROTH: Yeah, I was going to  
25      mention the coastal zone, because I live on the

1 coast and I've run up against a lot of projects  
2 where solar photovoltaics were not allowed in the  
3 coastal zone. Wind generators are not allowed in  
4 the coastal zone. And so that eliminates a whole  
5 area from what we're trying to do here.

6 MR. TUTT: I'd like to -- I think those  
7 are all interesting barriers and issues, but maybe  
8 to focus the conversation here a little bit.  
9 Moving on to part of question two here, the  
10 presentation that I gave today talking about  
11 what's going to happen during 2005 and 2006, and  
12 funding for this program and the emerging program  
13 at the PUC -- here, and the self generation  
14 incentive program.

15 How do we resolve these funding issues  
16 on this long-term sustainable basis that everyone  
17 is asking for? I know that CalSEIA has a plan for  
18 a long-term sustainable kind of path, but where  
19 does the funding come from, how do we go about  
20 that?

21 MS. MacFARLAND: We are working on that  
22 very hard, and I'm not really ready to -- there  
23 are a number of parties that we're working with.  
24 But there are clearly, you know, some options.  
25 Raising the PGC is an option. Extension of the

1 tax credits is another option. That's not one  
2 that we're pursuing actually. We assume that tax  
3 credits go away.

4 And there's some bonding options. But  
5 it is rather limited if you're looking for long-  
6 term funding for these programs in terms of where  
7 you can find it. And we're very open to other  
8 suggestions, but --

9 MR. RAYMER: Part of what we discussed  
10 before in our conversations with the solar  
11 industry was the establishments of certain  
12 agreements and commitments that if a product is  
13 available in certain quantities and certain price  
14 range, that on a regional basis large production  
15 builders may want to make themselves available to  
16 that. And, as such, make long-term commitments  
17 for that. The government can do a lot to help  
18 that occur.

19 And that's where you can get your  
20 massive scale, if you will, of the volume that  
21 you're looking for.

22 I think while they may not be ready to  
23 talk about specifics, that's probably going to be  
24 the direction to head. Because once again all the  
25 players are sort of happily participating in this.

1 And to the extent that government can provide some  
2 level of comfort and continuity that half way  
3 through the process the rug isn't going to be  
4 pulled out, that's all that we ask.

5 In essence, let us know, going into  
6 this, what the rules and availability of programs  
7 and incentives are so that we can work a framework  
8 around that. Rather than say, let's rush to get  
9 this done because the first in line are going to  
10 get it and the last in line, tough luck, that kind  
11 of thing.

12 MS. MacFARLAND: Yeah, I mean our view  
13 is that if we don't get ten years of certainty  
14 this year, it's going to be very hard to sustain  
15 the industry in the future. And we'll go the way  
16 the wind industry did, and perhaps the thermal  
17 industry did in the '80s. And have to fall apart  
18 before we came back together again. And hopefully  
19 that won't happen and we'll be able to lock in  
20 some certainty this year.

21 MR. NITZKIN: And one reference -- my  
22 name is Aaron Nitzkin; I'm sorry, I don't have a  
23 sign. I work for Sharp Electronics.

24 And one reference to the Japanese market  
25 that is quite important here is exactly this

1 issue. In Japan the government made a long-term  
2 strategic commitment to this; the manufacturers  
3 made a long-term strategic commitment. Their goal  
4 was to install 5 gigawatts of PV capacity by 2010.

5 In order to do that we had to have a  
6 declining rebate, but also a consistent year-by-  
7 year availability, certainty and availability of  
8 rebates.

9 When you have the long-term funding  
10 commitment, the manufacturers are then willing to  
11 step up to the plate, make bigger financial  
12 investments and capital outlays to develop the new  
13 generation of products needed to get the cost  
14 down, ease of installation up, aesthetics greater.  
15 And by doing that Japan is now by far number one  
16 and will continue to grow.

17 So I think we need to keep in mind that  
18 we need all these pieces together to insure the  
19 long-term growth.

20 MS. AGUILLON: I'm sorry, I'm Cecilia  
21 with Kyocera, another Japanese company. And  
22 actually, my founder was the architect of the  
23 Japan program.

24 And if you look at the graph of Japan  
25 what you will see is that the budget, the funding

1       for this program went from like 100 billion yen,  
2       and then in 2002 -- 2001, 2003 just went like 200  
3       billion. All of a sudden, just huge. Because the  
4       government wanted it now, they wanted a self-  
5       sustained market as soon as possible.

6               They wanted to get off the public  
7       subsidy in ten years; that was their goal. They  
8       were going to make it happen.

9               In 2003 it went right back down to about  
10      130 billion. And it's coming down again, and it's  
11      going to be pretty much gone. They're going to be  
12      putting money now in fuel cells because they feel  
13      that PV's done. We have like what, five of the  
14      top seven PV manufacturers are Japanese. That's  
15      what it created. It created a self-sustained  
16      industry, and then in California has created 500  
17      companies, not jobs, companies, that employ two to  
18      about 50 people.

19              And if we want economic development that  
20      comes with it, we need to see that commitment.  
21      And it can only come from the government  
22      unfortunately. We have to see that there is, we  
23      want to invest in manufacturing, we want to invest  
24      in improving the efficiency, reducing the cost.  
25      But if we don't see a market in two, three years,



1       like today, you know, Jan said you will have  
2       money, will you see 2006 money. What's going to  
3       happen next year? We don't know. Why should we  
4       be investing in that?

5               PRESIDING MEMBER GEESMAN: Well, let me  
6       jump in here and say a couple of things. One,  
7       it's extraordinarily hard for state government to  
8       make a long-term or sustainable commitment. If  
9       you're looking for a ten-year commitment take me  
10      back to 1994 and tell me what long-term  
11      sustainable commitments were made then.

12             I was around this Commission in the mid  
13      1970s where we thought we had a sustainable energy  
14      program. And by about the mid 1980s it had  
15      largely eviscerated. I think that you need to  
16      work on a strategy that is pretty much idiot-proof  
17      in terms of the people that will occupy these  
18      seats in the future, or the people that actually  
19      get elected to office in the future.

20             I would suggest you take advantage right  
21      now of what I think is a very focused level of  
22      attention in the executive branch where the  
23      Governor has made very clear his desire to  
24      accelerate and expand the state's renewables  
25      program. But he's not going to be here forever.

1 And he, I think, is confronted with the fact that  
2 our existing program is financially unsustainable.

3 You know, we can make it to about the  
4 end of the year at a current installation rate of  
5 about 5000 units a year. And, you know, the next  
6 six months are going to involve us breaking off  
7 pieces of office furniture to feed the furnace.  
8 Because that's what we do when we reallocate  
9 money.

10 Now, if the Governor wants us to get to  
11 an installation rate of 60 or 70 or 75,000 units  
12 per year, perhaps not next year, but at some  
13 foreseeable point in the future, seems to me we're  
14 going to have to come up with some different  
15 funding sources, some different program  
16 mechanisms. I think we're going to have to  
17 reevaluate whether spending all of the money in  
18 one big check upfront makes any sense.

19 I think all of these questions need to  
20 be on the table and to be seriously thought  
21 through. We don't have a lot of time to do that.  
22 I mean it's probably not the way programs should  
23 be designed, but, in fact, it's the way they often  
24 are. And people are going to be forced to rush.

25 And probably one of the real forcing

1 functions of that rush is Bernadette's  
2 legislation. The Legislature is going to go home  
3 at the end of the summer. My guess is we're going  
4 to have to address a lot of these questions before  
5 that happens.

6 COMMISSIONER PFANNENSTIEL: John, just  
7 for a second. I would like to observe that we do  
8 have most of the right people in this room to  
9 start figuring it out. I mean I don't think it's  
10 going to be easy; in fact, it clearly is going to  
11 be easy. But we have assembled here  
12 representatives from virtually all of the groups  
13 that need to be around the table, and they're  
14 literally around the table.

15 But I think that part of the question,  
16 though, is, as you pointed out, the near-term  
17 funding. And part of it is the slightly longer  
18 term cost reduction.

19 I was really encouraged looking at the  
20 slides from Japan and Germany to see that  
21 economies of scale really do work; and at some  
22 point the costs are coming down.

23 Now, we need to hold off and to build  
24 that critical mass up to that point, but I think  
25 that, you know, it isn't a forever problem, I

1       guess is what I'm trying to say. If we can keep  
2       it alive we probably can keep it sustaining.

3               So, I'm sorry, Bernadette, you had a  
4       comment?

5               MS. MacFARLAND: I think if we did  
6       achieve ten years, a decade of funding, which,  
7       believe me, I understand how hard that is and may  
8       not happen, we can get solar off of the dependence  
9       on incentives. And that it ultimately is a wise  
10      ratepayer investment, and that's something we're  
11      going to have to be working really hard to prove.

12              And if we look at what's happened in  
13      Japan and Germany, if we've learned anything, it's  
14      the long-term planning commitment that's really  
15      helped under, you know, serve as the foundation  
16      for that sustainable industry. So, I agree with  
17      you.

18              MR. HECKEROTH: Could we look for just a  
19      minute at a revolving loan program. Instead of  
20      running the money through once, then we could run  
21      it through many times. If we had put the millions  
22      of dollars that we've put into the incentive  
23      program into a low-interest loan program we would  
24      now be getting reimbursed for those first loans,  
25      and be able to reuse that money for new projects.

1                   And those would, again, pay back their  
2                   loan and be able to be used again. This once-  
3                   through stuff has to stop. It's like solar  
4                   welfare.

5                   MS. MacFARLAND: One of the things in  
6                   our performance pilot we want to look at is try a  
7                   couple of low-interest loan concepts.

8                   MR. RAYMER: Is that the green bank  
9                   concept?

10                  MS. MacFARLAND: Well, it could be.

11                  MR. RAYMER: Maybe use of PERS money  
12                  or --

13                  MS. MacFARLAND: Right now the green  
14                  building bank is an efficiency bank, as Sheryl  
15                  will tell you. But, there's no reason why it  
16                  couldn't be expanded to include solar.

17                  MS. JONES: I guess one of the questions  
18                  is if you're doing a pilot program and you don't  
19                  have a revolving loan fund set up, how do you  
20                  access funds and how do you demonstrate it.

21                  MS. MacFARLAND: Right.

22                  MS. JONES: That's one of the questions  
23                  that we're grappling with.

24                  MR. HECKEROTH: I think we can work with  
25                  existing financial institutions. They make

1 mortgages. I'm finding that there's a lot of -- I  
2 got calls back from 12 financial institutions for  
3 a larger PV array that I was trying to put in.  
4 And they were all anxious to get involved.

5 MS. Del CHIARO: Well that bring up --  
6 it seems to me that a revolving loan or a  
7 different type of lending bank may make sense for  
8 the very large installations, but when it comes to  
9 an individual homeowner, which is again one of the  
10 markets we really need to penetrate more deeply,  
11 you know, we already have a low-interest loan  
12 program set up that we can take advantage of by  
13 rolling it into the cost of the home, itself,  
14 which is, again, the whole idea of setting the  
15 minimum standard.

16 I just wanted to comment on some of the  
17 previous statements of, you know, I think as much  
18 as the Legislature is another arm of the  
19 government that we need to involve in this to make  
20 all of this happen, I think there hopefully is  
21 interest in this session in solving even these  
22 near-term problems, as well as playing a role in  
23 creating, you know, long-term larger markets,  
24 long-term sustainability that we should tap into.

25 And that there is, again I said in my

1 overview, I think there is tremendous amount of  
2 support from the public for investing specifically  
3 in solar power. And I just want to make sure it  
4 gets said at least once in this meeting today  
5 that, you know, again, we would be more in support  
6 of increasing the fund for solar, increasing the  
7 public goods fund dollars in the total pot than  
8 drawing upon, you know, the existing renewable  
9 energy or the new renewable energy funds, just to  
10 put that out there.

11 MR. ROBINSON: When you talk about  
12 reducing the subsidies and to make PV self  
13 sufficient, I don't quite understand how we go  
14 about doing that. PV is a very tough value  
15 proposition. Without reducing the cost of the  
16 panels significantly, or increasing our electric  
17 rates, how do we do that? How do we accomplish  
18 that?

19 MS. Del CHIARO: If I can just jump in  
20 real quick, but that's exactly what building it  
21 during construction does. It's a significantly  
22 right off the bat reduces the cost of the PV  
23 system automatically. And that again gets back to  
24 our precious dollars and precious ratepayer funds  
25 are then stretched a lot further when we do it

1       that way.  It's just common sense.

2               But that's the first, the most common  
3       sense low-hanging fruit way that we do that.

4               MS. AGUILLON:  Yeah, actually the way  
5       you do it is in Japan it was about \$20 a watt  
6       about ten years ago.  And now it's about 7.  It's  
7       cost effective because the rate is about 21 cents  
8       a kilowatt hour in Japan.

9               So, here, today it's about 21 cents a  
10      kilowatt hour today PV.  We're going to bring it  
11      down to 12.  To do that we need to replicate what  
12      Japan did by increasing the demand, economies of  
13      scale will bring the prices down.  There is more  
14      competition.  We have a huge competitor in the  
15      room, GE.  But, you know what, they're going to  
16      make my company bring prices down.

17              Sharp is about to unveil their 300  
18      megawatt plant.  We're about to double our  
19      capacity.  All of these are doing that.  That's  
20      bringing prices down.  Not today.  Maybe in about  
21      four or five months.

22              And the point is, when you have -- when  
23      we see a program that we know every year the -- is  
24      going to go down by 7 percent, 5 percent, whatever  
25      the commission or PUC, government decides, then



1       your installers, also they compete. They have to  
2       be creative to bring prices down. Because we know  
3       that the public dough is going to go away.

4               I met with people from the IBEW, even  
5       the unions are telling me they're working on  
6       bringing their installation costs down because of  
7       the same reasons. So it is possible.

8               MS. MacFARLAND: We went from 50 down to  
9       \$3 a watt, and if we get down to 2, at the sell  
10      level, we should be able to do the 12 cents. And  
11      there are a number of ways that we haven't had a  
12      chance yet to do, but bulking insurance costs,  
13      workers comp, those kinds of things that we can  
14      help with the installers, lowering their costs as  
15      well.

16              So, we've got a lot of work to do to  
17      meet that 10 to 12 cents. But it's not a lot of  
18      R&D. Although when you set the incentives  
19      directionally correct and that's what your goal  
20      is, I think you're going to have a lot more R&D  
21      and a lot more interest in driving a town that  
22      way, too.

23              MR. NYBERG: Yeah, as far as a source of  
24      funds, one of the things I want to make sure that  
25      gets explored more deeply Bob touched on earlier

1       today, and that is reducing the cycle time for  
2       entitlements. And if you simply looked at a  
3       source of funding to the builders for putting  
4       these houses in, if a builder is going to sit on a  
5       lot for eight years, what's the average they sit  
6       on it, maybe four years, three years before they  
7       can start to build in California?

8               If it's \$100,000 a lot and he sits on it  
9       for a year it costs him five grand to sit on the  
10      lot. The opportunity cost of not selling that  
11      \$400,000 house for a year or two years or three  
12      years, depending on how long he has to sit on it,  
13      the money is there in the system. And if we can  
14      simply figure out a way, and I know it's not easy  
15      and people look the other way and they go, it's  
16      never going to happen, it's really hard, but if we  
17      can figure out how to streamline the review  
18      process and streamline the entitlements to these  
19      builders and tie that into a commitment from them  
20      to build super energy efficient homes, zero energy  
21      homes, whatever we want to call them, and  
22      including PV, we can get the builders to fund the  
23      project.

24              Because they're going to be reaping  
25      rewards far past the cost of the system. And if

1       we can tell a building in a community with 100  
2       homes that he can pay for all the PV and all the  
3       energy efficiency features in these homes, and he  
4       can get his project done a year earlier and out to  
5       market, he's going to be able to do all those  
6       things we want him to do, and he's going to have  
7       money left over in his pocket that is his  
8       incentive to help do those.

9               So, I think that one of the things we  
10       should think about is not where can we go find a  
11       bucket of money to serve these programs, but how,  
12       in our existing system, can we take some of the  
13       things that companies like Sharp and Kyocera and  
14       GE do, and private industry, to streamline our  
15       processes, make them more efficient, make them  
16       more cost effective through something as simple as  
17       just getting entitlements approved.

18              And I don't mean it's simple to get it  
19       done, but they can't start building until they get  
20       approved, and it's a really -- seems like a simple  
21       thing, I know it's not. But I just want to make  
22       sure that we all understand, the money could be  
23       there, and I think the support from the building  
24       industry would be there.

25              If you could go to your builders and say

1       you can get out two years earlier, two and a half  
2       years, or even six months, you know. We have to  
3       play with the numbers and figure out what the  
4       value is to them, but there definitely is value  
5       there.

6               MR. RAYMER: To be clear, no one's  
7       suggesting that we get rid of environmental  
8       review. The point is find those inefficiencies  
9       and then do what we can to correct them.

10              MR. NYBERG: Absolutely, yeah. In no  
11       way do we mean to bypass any of it, just figure  
12       out how to do it either in parallel or more  
13       efficiently, exactly.

14              MR. BLAIR: And the City of San Diego  
15       does have a program where we put infill housing  
16       that has energy efficiency and self generation to  
17       the head of the line. And we actually have  
18       created a new department within our inspection  
19       services and plan check. And they handle only  
20       those permits.

21              So, now one complication that happened  
22       to us was because of the Cedar fires that we had,  
23       there were so many homes that were burned. That  
24       same group got pulled into doing the permits for  
25       them. And so we've been kind of overwhelmed, but

1 the process is there.

2 And they've been streamlining it; it  
3 hasn't worked as well as we thought. And we found  
4 the kinks. A lot of it involves things that are  
5 not under the control of the City, itself. It's  
6 the other reviewing agencies that you have to go  
7 out and get their permits. And we can't control  
8 their time.

9 But what we are doing, as the City, is  
10 expediting every component that we have within the  
11 City's control. And that includes the physical  
12 inspections of the property as the homes are  
13 built.

14 MR. RAYMER: That's very positive  
15 because infill housing, in many respects, is more  
16 problematic across the state than new  
17 construction. So, that's very positive.

18 MR. BLAIR: One thin we found, we  
19 initially set the limit of units that were needed  
20 to qualify as ten units. And we found that was  
21 just too high. There weren't people building that  
22 many at one time. So we've lowered that to four  
23 and we've had better response at that level.

24 MR. HECKEROTH: The incentive also has  
25 to provide an incentive. I remember I was in

1 Tim's office three years ago saying eliminate the  
2 50 percent and the prices will go down. And  
3 because it was going up to 4.50 and all of a  
4 sudden all the projects were costing \$9.

5 And it was so obvious. But it took  
6 awhile to understand that eliminating the 50  
7 percent was going to eliminate paperwork; and it  
8 was also going to provide an incentive for  
9 lowering the cost of installations. A simple  
10 thing like that. And then beyond that to  
11 eventually lower the rebate amount.

12 But beyond that we have to start looking  
13 at performance as the ultimate measure. And we  
14 have to start including the externalities in all  
15 these conventional sources of electricity. And if  
16 we can't do that, then we're not going not make  
17 it.

18 But is there some agency in the state  
19 that can start analyzing the externalities  
20 involved in fossil fuel and nuclear?

21 MS. MacFARLAND: In my CEERT capacity in  
22 the way distant past we spent, I don't know, ten  
23 years with the Energy Commission and the PUC  
24 trying to come up with some externalities. I  
25 think we came up with a cent. And the kind of

1 externalities that you're talking about is much  
2 more comprehensive.

3 MR. HECKEROTH: It's like \$1.2 trillion  
4 a year on electricity.

5 MS. MacFARLAND: Right. And you  
6 probably throw in the war there, too, and --

7 MR. HECKEROTH: No, that 's --

8 MS. MacFARLAND: Okay, okay.

9 MR. HECKEROTH: That's not including  
10 the --

11 MS. MacFARLAND: Okay. But, it's rather  
12 hard. We think that certainly REC ownership is a  
13 very important concept, along with that metering.  
14 I strongly believe in externalities, but I know  
15 how hard they are to develop in a public process.

16 But I'm not saying that you can't do  
17 that. It's just having been through it, we came  
18 up with a cent a kilowatt hour. And I'm not  
19 saying that that's nothing, but it's not the kind  
20 of incentive you're thinking of.

21 MR. TUTT: I'm interested --

22 PRESIDING MEMBER GEESMAN: Well, I would  
23 suggest that a good, near-term benchmark of that.  
24 Because I tend to share Jan's skepticism, although  
25 it's been a long time since I was trained as a

1 lawyer, I just think that you put it through the  
2 public meat grinder process and you're not going  
3 to achieve a consensual level that policymakers  
4 are willing to subscribe to.

5 A near-term test of that will be a much  
6 simpler issue, and that is what is the hedging  
7 value against natural gas price volatility. The  
8 Public Utilities Commission, I think, is going to  
9 determine that in their market price referent  
10 decision for RPS. And we'll see what they're able  
11 to do. Arguably that should be a simpler thing to  
12 calculate than the dollar value for CO2 reduction.

13 MS. Del CHIARO: I apologize, I have to  
14 step out. Time flies when you're having fun. I  
15 didn't realize it was 3:30 already.

16 But, I just wanted to add, since we  
17 approached incentives, on one level, just again  
18 sort of caution us, if the goal is to increase the  
19 market in a substantial way to drive down the  
20 costs, some of these incentives may be helpful.  
21 But I don't think they'll be the lion's share of  
22 kind of creating the kind of markets we're talking  
23 about. Every single district has different  
24 requirements in time, you know, time limitations  
25 on, you know, the permitting process.



1                   And, again, my conversations directly  
2                   with the builders, a variety of them across the  
3                   state, it's not very -- it doesn't seem as though  
4                   that will be enough of an incentive to really  
5                   start building enough solar homes to make a  
6                   difference in our market.

7                   So, something that we should just want  
8                   to be careful about.

9                   Thank you, and I look forward to  
10                  continued conversation.

11                  PRESIDING MEMBER GEESMAN: Thank you,  
12                  Bernadette.

13                  MR. TUTT: I'm interested that the City  
14                  of San Diego's effort in that regard, though, and  
15                  how could that model be replicated in other cities  
16                  across the state. There's not really a state  
17                  agency that would require you to do that, or that  
18                  would require any city potentially to do similar  
19                  things, is that right, Tom?

20                  MR. BLAIR: That's correct, it was an  
21                  initiative that actually came from a number of the  
22                  developers within the City who were working infill  
23                  projects. And they were so frustrated by the year  
24                  delay in approval of the permits that, you know,  
25                  they started coming to the Council and saying, we

1       need to fix this.

2                   And came up with the model that actually  
3       works. And then showed it at a few of the smaller  
4       projects. And it still isn't working the way we'd  
5       like, but it's much improved. And I think has the  
6       potential that we could see significant growth in  
7       that area.

8                   PRESIDING MEMBER GEESMAN: If I heard  
9       you correctly, though, you need to get the school  
10      district and the water district and the park  
11      district and the other --

12                  MR. BLAIR: Transportation --

13                  PRESIDING MEMBER GEESMAN: -- entities  
14      on the same timeframe.

15                  MR. BLAIR: Right, and some of it's  
16      coastal review, some of it's -- you know, it's all  
17      of the different review agencies depending on  
18      where the project is.

19                  MS. MacFARLAND: I mean isn't that  
20      really OPR and the State Clearinghouse? I mean  
21      isn't that -- I mean early noticing or something  
22      like --

23                  MR. RAYMER: HCD's looked into this  
24      about a dozen times over the last 20 years, and  
25      they keep running into the myriad of differences

1       between local jurisdictions. But the fact of the  
2       matter is an infill project, a simple fourplex at  
3       a corner lot, why are they doing extensive traffic  
4       congestion projections, you know, down the road.

5               I mean, if they've already had an EIR  
6       done, why do they have to come in and do the  
7       secondary and all these other little things to  
8       make different offices within the jurisdiction  
9       happy that they've complied with this or that.

10              There's got to be a way to consolidate a  
11      lot of this review so that the redundancies are  
12      taken out of it.

13              PRESIDING MEMBER GEESMAN: And it's high  
14      on Secretary McPeak's priority list.

15              MR. RAYMER: Absolutely, she's made it  
16      very clear --

17              PRESIDING MEMBER GEESMAN: I've talked  
18      to her several times on this.

19              MR. RAYMER: -- that she --

20              MS. MacFARLAND: That doesn't take away  
21      from the environmental protection, I agree with  
22      you. I do, yeah.

23              MR. RAYMER: Both of you were indicating  
24      earlier that the amount of the tax credits, if you  
25      will, the 50 percent buydown, although it's less

1       than 50 percent now, should that be far less so  
2       that it can be spread out more? Is that one  
3       opportunity to have some type of continuity for  
4       the long haul?

5               MS. MacFARLAND: Well, I was told by one  
6       of my Senate advisors to not go there. That it  
7       was just too hard to do.

8               MR. RAYMER: Got'cha.

9               MS. MacFARLAND: So, in our incentives  
10      that we proposed at the Energy Commission and at  
11      the PUC, we assume there will be no state or  
12      federal tax credits. If those tax credits  
13      happened, then like, for example, if this federal  
14      tax credit, if we're able to turn it around on the  
15      efficiency and the PV on the PV side it would take  
16      care of about a quarter of the cost of the  
17      program.

18              So it could be significant. And I think  
19      if we combine the efficiency side of that, too, it  
20      would be a lot more, actually. Because we're  
21      actually proposing more for efficiency than PV in  
22      our zero home thing.

23              MR. TUTT: I think in part you were  
24      talking about the buydown --

25              MR. RAYMER: I'm talking about the

1       buydown, but I also was concerned when I heard  
2       today about the House bill, taking certain things  
3       out of it. I'm familiar with the Snow-Feinstein  
4       bill which apparently, as of last Friday, still  
5       had efficiency in it.

6               MS. MacFARLAND: My understanding it  
7       wasn't, and I asked David Goldstein, because I saw  
8       him on Saturday and he sent me about 50 pages  
9       yesterday --

10              MR. RAYMER: Then that's -- you're  
11       right. Because David was trying to get a letter  
12       of support on some --

13              MS. MacFARLAND: Yeah, right.

14              MR. RAYMER: -- few things from us on  
15       Wednesday.

16              MS. TURNBULL: I'd just like to comment  
17       that in terms of a tax credit at the state level,  
18       the League would not support that. We think the  
19       budget is in such bad shape now that we would  
20       definitely not support that.

21              MR. TUTT: And the federal budget's in  
22       better shape?

23              MS. TURNBULL: No, we --

24                   (Laughter.)

25              MS. TURNBULL: I'm not speaking about

1 the federal budget, but the state budget --

2 MS. MacFARLAND: As I understand,  
3 doesn't 30 percent of the state tax credit go back  
4 to the --

5 MR. TUTT: Some of it is contributed to  
6 the --

7 MS. MacFARLAND: So, it's a rather  
8 inefficient tax credit, if you're going to have  
9 one. And I was told no, so I listen --

10 MR. TUTT: In terms of the buydown,  
11 though, we did -- I did present a scenario where  
12 we reduced the rebates more dramatically and, in  
13 fact, we took a dramatic drop in rebates last  
14 December trying to spread the money further.

15 So it is something that's -- it's a part  
16 of our conceptual tools here. It does, if we go  
17 too far too fast, and we don't know exactly when  
18 that is, existing homeowners would probably say  
19 this just isn't worth it to me.

20 MS. MacFARLAND: Well, if we keep  
21 driving the costs of the installed systems down,  
22 as well, which is what our commitment is based on,  
23 I think that --

24 MR. TUTT: Why, in that one chart, the  
25 drop in cost of installed systems over the last

1 four years decreased so much more in Germany and  
2 Japan than here? Is it just economies of scale?  
3 Any reason for that?

4 MS. AGUILLON: Are you talking about the  
5 installed price?

6 MR. TUTT: Yes.

7 MS. AGUILLON: Really, I mean it was  
8 decreasing in stages, along with everything else.  
9 So last year it was about \$8 a watt; this year  
10 about \$7. Because of this year -- in 2003 it's  
11 about 200 megawatts installed, so that brought the  
12 prices down a lot.

13 MR. TUTT: \$8 and \$7 a watt installed  
14 price is fairly consistent with what the installed  
15 price is here.

16 MS. AGUILLON: Right, but the electric  
17 rate is 21 cents.

18 MR. NITZKIN: Keeping in mind as  
19 production capacity doubles generally speaking  
20 costs go down about 18 percent. So, you can --  
21 that has been relatively consistent for a number  
22 of years now. So that is something that we can  
23 almost plan on for this market very accurately.

24 MS. MacFARLAND: I was told yesterday  
25 that the German market last year did 117

1 megawatts, and they're doing 300 megawatts this  
2 year is what they think they're doing. So we are  
3 talking about volumes.

4 And the whole EU is getting more  
5 organized on that, too. A lot of our members,  
6 that's where they are right now, because there is  
7 the longer commitment to --

8 MR. BLAIR: The tariff structure, I  
9 think, also impacts that because we are -- because  
10 there's so much DWR power around the demand  
11 charges have gone down so far that if you're not  
12 offsetting the premium peak prices that we were  
13 five years ago.

14 MS. MacFARLAND: Bill Marcus has pointed  
15 out to me that in reality both efficiency and PV,  
16 there's no economic value to the ratepayers until  
17 those contracts start to expire, which is 2007,  
18 2008. So we really don't have a market now.

19 MR. BLAIR: And one other question or  
20 concept that I've been kicking around is looking  
21 back years ago when the utilities could act  
22 basically as the bank and you had a demand side  
23 management program, and then they would add a  
24 component to your cost per kWh and you paid them  
25 back through that.



1                   And I had done several projects on it  
2                   that were a couple hundred thousand dollars, and  
3                   paid for themselves in four years. I don't know  
4                   whether that's a mechanism that can be replicated.  
5                   I know it's not available now in any form.

6                   MR. TUTT: It's sort of like a utility  
7                   billing for the cost of the system?

8                   MR. BLAIR: Right. They upfront the  
9                   capital for the efficiency savings. And they were  
10                  looking at, at that point in time, it was if you  
11                  give us x efficiency we'll loan you the money.  
12                  And then you pay it back over time.

13                  MR. ALLEN: I would just offer that  
14                  we've seen prices lower than \$5 a watt at the  
15                  fairgrounds for megawatts. I was just going to  
16                  ask Bob, at what price point would you be happy?  
17                  Because we can talk about lowering the prices,  
18                  lowering the prices, but is \$5 a watt installed --  
19                  you talked about a bulk buy kind of concept, co-op  
20                  buying.

21                  MR. RAYMER: I think we're talking about  
22                  \$4.50 or \$5.

23                  MS. MacFARLAND: Well, I think -- no, we  
24                  were talking about \$5, I think, --

25                  MR. RAYMER: I mean you can get that

1 price with a bulk purchase right now.

2 MS. MacFARLAND: But it was more 75  
3 cents of that was in the first two years was  
4 training. So, because we felt that the builders  
5 were going to want the manufacturers to train  
6 their contractors.

7 So, it's roughly the same.

8 MR. ALLEN: My point is that if you  
9 create this dependence on rebates where you're  
10 very close to not needing them, that you're going  
11 to inhibit the market from growing anyway.

12 MR. RAYMER: Except right now large  
13 scale application is dependent on the rebates.

14 I'm not necessarily wanting to change  
15 the subject, but there's sort of two large  
16 entities in the room, PG&E and Edison, that, you  
17 know, not that I want to pull them out of their  
18 chairs, but it would be really interesting to hear  
19 how huge public utilities, if they have an  
20 interest in this, if they've got an opinion in  
21 terms of long-term applications, it seems like  
22 from a peak load perspective isn't there a huge  
23 benefit here to a utility? At least for some  
24 short-term avoided costs?

25 MS. MacFARLAND: Well, if you look at

1       their reply comments at the PUC from yesterday, it  
2       doesn't look like they feel that way.

3                   (Laughter.)

4                   MR. RAYMER:   And I understand, and I  
5       guess I know what the answer's going to be, but  
6       I'm just dense.   It just seems, you know,  
7       everybody's always telling me what I should be  
8       doing, because, you know, it's good for you, Bob,  
9       you won't mind this extra \$20,000.

10                  And, in fact, putting it into the  
11       financing over 30 years, it will knock out the  
12       people on the bubble.   But since the bubble is  
13       rising so quickly what difference does that make.  
14       Nobody can afford a home anyway.

15                  But the fact of the matter is there are  
16       a number of entities, including the utilities, who  
17       may be a partner in all this that I'm hoping  
18       sooner or later come to the table.

19                  Because it seems to me they've got some  
20       really positive, long-term interest in seeing this  
21       thrive.

22                  MS. MacFARLAND:   The solar industry  
23       would definitely like to see a partnership.   I  
24       guess where I have two issues with the utilities.  
25       Because we don't have access, a transparent

1 market, and we don't have access to the data,  
2 answering questions like net metering and okay,  
3 let's agree that we're going to pay the utility  
4 for use of the grid when the system isn't working  
5 on a zero energy home, for example.

6 How do we figure out what those costs  
7 are without having reasoned analysis and to look  
8 at those costs? We get fairly hostile comments in  
9 about PV in the Public Utilities process. And,  
10 you know, clearly we have to all figure out how to  
11 work together.

12 I guess my biggest concern about if the  
13 decision was to turn solar, for example, over to  
14 the utilities, is that we are committed to  
15 reducing our costs over time. And the standard  
16 recovery mechanism of utilities being for every  
17 dollar they spend that they get rate recovery, I  
18 don't think that would be a directionally correct  
19 way to help us get solar to be cheaper.

20 But there's a difference between the  
21 munis approach and the IOUs approach, as well.  
22 And hopefully we'll get some IOUs that will see  
23 some benefits to the solar technologies. But it's  
24 been rather hostile.

25 MS. TURNBULL: I think there are some

1 differences between how the IOUs perceive this. I  
2 do know that PG&E was very involved in the early  
3 R&D efforts to establish the real benefits of  
4 solar. And I think overall they have continued to  
5 largely support that.

6 But they, you know, there are individual  
7 components within the individual utilities I think  
8 that are a little recalcitrant. But I really  
9 think that there's not unanimity on the part of  
10 the utilities.

11 MR. TUTT: We do have a utility here.  
12 Steve, any light you can shed on the difference  
13 between IOUs and SMUD?

14 MR. FRANTZ: Well, my head is spinning  
15 with this discussion. To me you try to design the  
16 incentive program from some sort of basic  
17 principle from the beginning that everybody can  
18 agree to. And you can say who benefits should  
19 pay. But there are two ways of looking at that  
20 question.

21 You can say that everybody that puts a  
22 PV system on their roof benefits. The usefulness,  
23 that redounds to the benefit of every ratepayer in  
24 their service district because those people are  
25 helping to build out the resource base of the

1 future that will make that group of energy users  
2 more secure.

3 And so on the basis of that you can say  
4 everybody's going to pony up, I don't care whether  
5 you don't like it, we're all paying for this  
6 because we're all getting the benefit out of it.  
7 That's one way to do it.

8 The other way to do it is to say, okay,  
9 I think where we're trying to go or some of us are  
10 trying to go at SMUD, is to say let's forget about  
11 the collective approach for the time being, and  
12 let's get to a system where the utilities'  
13 relationship to PV mimics its relationship to all  
14 the other sources it buys power from.

15 So, if you're an individual customer and  
16 you're willing to take the risk of investing in a  
17 PV system for your roof, we're going to say thank  
18 you, one, for taking the risk, and taking some of  
19 the risk of investment off our shoulders by  
20 putting up your own capital; and we're also going  
21 to say thank you for choosing a technology that  
22 has a lot of incredible benefits to us, mainly  
23 environmental.

24 And so that's why I'm kind of interested  
25 in performance-based rebates which is a question I

1       hope we can get to before we adjourn today. But  
2       the way we're going at it is let's first of all  
3       look at what the value of a kilowatt hour from PV  
4       is for us, as a business, as distinct from a  
5       kilowatt hour bought from a natural gas-fired  
6       power plant.

7               Incredibly different kind of risk over  
8       the long term in this area of volatile fuel  
9       prices. How do you value that? We don't know  
10      yet. But we know that there is a value you can  
11      ascribe to it.

12             So we'll go through the old stack  
13      benefits exercise again and we'll disagree among  
14      ourselves, but everybody will agree there's some  
15      value, and we'll accept everybody's lowest number  
16      so that everybody's happy.

17             And we'll start that as a value of a  
18      kilowatt hour of PV for us at SMUD. Then we'll  
19      say, what is the value of a kilowatt hour of PV  
20      for the customer. What is the tipping point.  
21      What is the minimum cost per kilowatt hour we need  
22      to pay you to induce you to share in the  
23      investment with us.

24             We don't know what that is yet, either.  
25      But it's going to exceed what the value of the

1 kilowatt hour is to us as a utility. So we will  
2 add to our price per kilowatt hour the amount  
3 that's needed to equalize the two so that we can  
4 start to create a market. And we'll just call  
5 that the solar adder.

6 That solar adder will decrease over  
7 time, but the value of the stack benefits to us as  
8 a utility will not only not decrease, it will  
9 probably increase because the perils of relying on  
10 natural gas, I'm quite sure, is going to increase  
11 over time, as well as the value of externalities.

12 So, the kilowatt hour from solar starts  
13 with better and better classes of business; the  
14 amount we have to pay you, the customer, is a  
15 premium not only for taking the risk of  
16 investment, which we know you're not used to  
17 doing; you're used to us building your energy  
18 supplies for you, now you're doing it. But, for  
19 amortizing it over a five-year period or something  
20 like that, we need to pay you a premium for that,  
21 too.

22 So that would be sort of the basic logic  
23 of the pricing system. And see how many customers  
24 we'd get doing it that way. If we don't get  
25 enough, then you may say, wait a second, why



1       should each individual have to bear the entire  
2       risk. Everybody is going to get charged a  
3       surcharge in order to up the points so that some  
4       of you will invest in it. And that may be a  
5       further step down the line.

6               But it seems like there's at least a  
7       long-term logic to that sort of mechanism. I  
8       don't know what the numbers would be, yet, though.

9               I don't know whether that helps  
10      anything, but --

11              MR. TUTT: No, I think that it does.  
12      And it's sort of a segue into performance-based  
13      incentive programs which I'll kick off with a few  
14      questions or observations. First, one of the  
15      reasons we have a upfront buydown program, even  
16      though we have significant kind of performance  
17      requirements in it, is that the perception is that  
18      PV is expensive and that there's a first-cost  
19      barrier that needs to be brought down and  
20      addressed with an upfront cost. Maybe a low-  
21      interest loan helps that.

22              Second, Germany is doing a performance-  
23      based incentive program. The utilities read the  
24      meters. There's a couple of other ways to do it.  
25      One of them has been suggested by Tom Starrs for

1       small homeowners which is basically to have the  
2       homeowner read the meter, themselves, and send in  
3       the data; self reporting.

4               The other is high tech automation using  
5       an internet communication from the system to a  
6       website. And FatSpaniel does this, and a couple  
7       of other companies are now doing this for a  
8       certain price. That cost will come down over  
9       time. So, which of these three methodologies  
10      seems like it might be best in California.

11             And then I guess I'd ask, in terms of  
12      that solar adder, in Germany, Germany pays 50 to  
13      75 cents a kilowatt hour. Do you see those kind  
14      of rates, and do you see those kind of rates if  
15      they were viable being an issue in California?

16             MS. MacFARLAND: On the 50 to 75 cents I  
17      think that's probably not going to happen.  
18      However, our sun is 30 percent better than the  
19      German sun. So you could take the 54 cents and  
20      discount it 30 percent and get to something that's  
21      a bit -- I'm not suggesting -- that's why we want  
22      to come and work with you on the pilot and try a  
23      couple of things.

24             I think Tom Starrs' self reporting piece  
25      also had 10 percent monitoring, as well. We want

1 to make sure that whatever we come up with  
2 collectively among all parties is something that  
3 works.

4 So, I don't know what the answer is.  
5 You know, maybe some of it's some money upfront  
6 like Pennsylvania does. And then they measure the  
7 system after one year. Although if it was a  
8 cloudy year it's kind of a sad day for you.

9 So, there are just a lot -- it's not an  
10 easy question. But I think it is where the  
11 industry, to get the kind of certainty we need in  
12 the Legislature, it's going to be required.

13 MR. OVSHINSKY: Is it okay to ask a  
14 question?

15 MR. TUTT: Yeah, can you go to a mike?

16 MR. OVSHINSKY: Do I have to do the  
17 mike? I have a pretty loud voice. It's a single  
18 question.

19 PRESIDING MEMBER GEESMAN: No, you  
20 should go to the mike because that way the  
21 reporter will get it for the transcript.

22 MR. OVSHINSKY: Ben Ovshinsky from ECD  
23 Ovonics. The German, and I don't know the answer  
24 to this, the German 54 cents a kilowatt hour, is  
25 that just a mere arbitrary generous, incredibly

1       generous incentive? Or have they priced  
2       externalities in that? And is it done for us?

3               MS. MacFARLAND: I don't know, Ben. I  
4       don't know what --

5               MR. OVSHINSKY: I suspect they have; I  
6       mean, I don't know.

7               MS. MacFARLAND: Yeah, I don't know.

8               MR. ALLEN: I'd like to suggest there's  
9       a difference between what we have here in  
10      California and Germany. Germany, the meter goes  
11      right out to the grid. It's fed into the grid  
12      directly. Here we have net metering, so we have  
13      that benefit.

14              There they have a ten-year payment  
15      period.

16              MS. MacFARLAND: Twenty.

17              MR. ALLEN: It's 20?

18              MS. MacFARLAND: Twenty.

19              MR. ALLEN: What happens after that?  
20      Does the utility just get the power after that?  
21      So, --

22              MS. MacFARLAND: No, they own the  
23      systems and the utility pays them for the power  
24      for 20 years.

25              MR. ALLEN: But what happens to that

1 power --

2 MR. TUTT: -- after that 20 year period.

3 MR. ALLEN: You got to rewire them --

4 MR. TUTT: Nobody knows.

5 MR. ALLEN: So, --

6 MR. NITZKIN: They're not guaranteed --

7 MR. ALLEN: So you got to shut them

8 off --

9 MR. NITZKIN: -- guaranteed (inaudible).

10 MR. ALLEN: So they'll see what happens.

11 MR. NITZKIN: Thereafter, I don't know

12 (inaudible).

13 MR. ALLEN: Yeah. Well, the one

14 benefit, we have net metering established here.

15 Even if you add a kilowatt hour pricing scheme, in

16 addition to that metering, after the ten years or

17 five years or whatever we come up with, we still

18 have the benefit of net metering to the homeowner.

19 So you don't have to rewire the house basically to

20 still get benefit out of that system, which is

21 nice.

22 So then you can actually calculate the

23 benefit of net metering, add in the 25 to 30 cents

24 per kilowatt hour range, to get what you need, to

25 stimulate the market.

1           The other thing that's something to look  
2       at is that the utilities, and Steve just outlined  
3       this, have a motivation to provide a kilowatt hour  
4       incentive to help meet their RPS goals. And  
5       that's something worth exploring. What's that  
6       worth, 1 cent, 2 cents, 5 cents, in that equation.

7           The other one is allowing them some, the  
8       utilities to assign a higher incentive for west-  
9       facing systems, because that gives more peak  
10      benefit. Or capacity constrained areas.

11          So, there's -- I've talked with a number  
12      of installers who've also voiced, you know, with  
13      all due respect to the rebate program, some  
14      frustration in the amount of time they spend  
15      administrating and doing all the paperwork. It's  
16      almost as much time as it takes to install the  
17      system. And yet we still don't know how those  
18      systems are performing.

19          So there's something, a little red flag  
20      there that would suggest moving towards  
21      performance based.

22          MS. MacFARLAND: But at Los Angeles  
23      Department of Water and Power, because of  
24      efficiency of the systems has become such a big  
25      issue for us, because a lot of systems were put on

1 north side, so the roof and the round round  
2 buildings, by the Department that we're now being  
3 held accountable for.

4 We've proposed meters to be put on all  
5 the systems, even though it's not cost effective  
6 from a real cost effectiveness test. But, because  
7 it is a complex issue of what is the output of the  
8 system. And short of metering it, you know, there  
9 are ways, Tom Hoff, there's a number of people  
10 that have ways of doing it.

11 But we've had a lot of problems with the  
12 CLA and the folks that are analyzing solar systems  
13 that weren't straight about what the output of the  
14 systems were, and were cooking the books the other  
15 way. So that's why we decided to go ahead and  
16 propose meters.

17 MR. HECKEROTH: The one net metering  
18 system has a real problem in that you never know  
19 how much you're producing. Because it just  
20 offsets what you're using during the sunlight  
21 hours. And it runs the meter backwards.

22 But you don't actually know, so I would  
23 be in favor of a two-meter system so that we would  
24 actually know what the solar array was producing,  
25 and people could get credited for that.

1 MS. MacFARLAND: If we're going to get  
2 REC ownership, and that's another piece, too, it's  
3 going to have to be metered so that takes you  
4 there, as well.

5 MR. HECKEROTH: Yeah, it's a requirement  
6 for performance-based --

7 MS. MacFARLAND: And then we don't have  
8 to argue about what the output of the system is.

9 MR. ALLEN: Right.

10 MS. MacFARLAND: It may have not been a  
11 cost effective decision.

12 MR. ALLEN: I mean if you're a building  
13 owner and you choose to put all your solar array  
14 on the north side and upside down then that's your  
15 problem.

16 MS. MacFARLAND: You shouldn't get  
17 rebate money.

18 MR. ALLEN: You won't get any incentive  
19 money --

20 MS. MacFARLAND: Yeah.

21 MR. ALLEN: -- per kilowatt hour.

22 MR. HECKEROTH: Yeah, it's got to be  
23 kilowatt hour instead of kilowatt, that's the  
24 goal.

25 MS. MacFARLAND: And figuring out that



1 transitions.

2 MR. TUTT: Yeah, the next question, you  
3 hit it on the head, Jan, is how do we transition  
4 to that if we're going to transition to that.

5 UNIDENTIFIED SPEAKER: To performance-  
6 based?

7 MR. TUTT: Yeah.

8 MR. FRANTZ: I have two issues with it  
9 that I would be grateful to anybody who could  
10 refer me to information or studies that have been  
11 done.

12 One is why won't it kill the market?  
13 Not that we know a lot about consumer behavior at  
14 this point, but the surveys that we've done with  
15 residential retrofit customers in SMUD territory  
16 is that they're people that want to be part of the  
17 solution that are buying the system because it's  
18 half the market price. Many of them have surely  
19 been waiting, have wanted solar for awhile.  
20 They've been waiting to the point where they can  
21 afford it. And so they can get it now for \$3.50  
22 or \$4 a watt from us.

23 And they are buying it from SMUD, who is  
24 an institution they trust. Those are two big  
25 considerations in their decision to purchase.

1                   If you suddenly say to a customer,  
2           you're not going to get \$4 a watt up front, we're  
3           going to pay you for output over a five-year  
4           period, what's that do to the customer's value  
5           proposition?

6                   And then the second thing is that we're  
7           going to have to pay them more to assume that  
8           five-year risk, and to wonder whether their system  
9           is going to perform such that they will be able to  
10          recoup as much as they hope to, won't the rebate  
11          level actually go up? I mean the total amount  
12          paid out. And if it does, how will that exert a  
13          dampening influence over price?

14                  Because where we're trying to get to  
15          eventually is a subsidy-free market. Could this,  
16          I don't know that it will, but would this extend  
17          the day at which we arrive at that point;  
18          meanwhile, making a sale considerably more  
19          complicated, decreasing sales volumes, et cetera.  
20          It could be a death spiral.

21                  MR. HECKEROTH: I think that the two  
22          things we've talked about have to be coupled. And  
23          that is some kind of a loan or a mortgage to pay  
24          the upfront costs, put it on credit. I mean  
25          that's what everybody puts everything --

1 MS. MacFARLAND: So you're cash  
2 positive.

3 MR. HECKEROTH: -- on credit. So that  
4 pays for the upfront costs, the loan does.

5 And then if you've got a 20- or 30-year  
6 loan, you've got a positive cash flow right from  
7 the beginning if the solar tariff or the solar  
8 rate is high enough to pay off the loan.

9 MS. MacFARLAND: Well, because people,  
10 and this is what we have to all sit down and talk  
11 about in a more organized way with some of the  
12 people that, like Tom and Tom Hoff and Ryan Wiser,  
13 but I think maybe I heard it from GE, is that  
14 because we don't stay in our homes for 20 or 30  
15 years, people move around in five or six or seven,  
16 maybe it has to be less than that.

17 Maybe there's a lot of --

18 MR. HECKEROTH: Their mortgage is  
19 still --

20 MS. MacFARLAND: Yeah.

21 MS. JONES: Let me ask a question. I  
22 thought that under the German program there was  
23 low-interest loans that were combined with the  
24 feed-in tariff; and that it was the two programs  
25 together that brought about the success.

1                   MR. TUTT: It used to be that way.  
2           They've gotten rid of the low-interest loan  
3           program.

4                   MS. JONES: As the program has ramped  
5           up. But in the first few years the combination of  
6           those is what may have resulted in the successes  
7           that they got.

8                   MR. TUTT: At least that's my  
9           understanding, is that when the feed-in tariff was  
10          reestablished in January it was reestablished at a  
11          higher level than before. And the low-interest  
12          loan program was not part of the picture any  
13          longer.

14                   MS. SMITH: -- volunteer to follow up  
15          with the specifics of the German program, as we've  
16          been doing a lot of work exploring that market.  
17          And so we could offer that to the Commission.

18                   Kari Smith with PowerLight.

19                   PRESIDING MEMBER GEESMAN: That would be  
20          helpful, Kari.

21                   MS. TURNBULL: I'd like to make one  
22          quick sort of analogy. It seems to me as though  
23          PV systems on the roof could be seen as parallel  
24          to navigation systems in cars. And as you buy a  
25          new car these days, most people aren't going to

1       buy a new car without a navigation system.

2                   What we have to do is sort of get an  
3       ethic out there so that people aren't going to buy  
4       a new house without a PV system. And it's going  
5       to be part of the cost of the initial cost of the  
6       house.

7                   MS. CARTER: I think that we do need to,  
8       I agree that we do need to move to performance-  
9       based system here for the long-term survival  
10      really of the technology, itself; if not market  
11      acceptance.

12                  But I've been hearing some, I think some  
13      pretty legitimate concerns. I have concern,  
14      myself, about the first-cost barrier and whether a  
15      loan is really going to take care of it, an extra  
16      meter. I've heard arguments in the past, and  
17      maybe these aren't true anymore, but for  
18      residential systems it's really an expense that's  
19      prohibitive in terms of putting in the metering.

20                  If that's the case, another alternative,  
21      maybe hybrid thing to look at, is still an upfront  
22      payment or maybe a two-phased buydown based on  
23      performance, based on the efficiency of the  
24      system.

25                  I mean we can get pretty good at

1       calculating, depending on where, you know,ow it's  
2       oriented, how big the system is, different things  
3       like that. And estimating efficiency, or maybe if  
4       you do it over a phased-in period, some upfront  
5       and some after a year or two. I'm just throwing  
6       this out.

7                You know, that's one way to still make  
8       it more performance based, but short of a per  
9       kilowatt hour type of a payment.

10               Obviously that's preferable in a  
11       performance-based system, but if some of these  
12       things at the beginning are too big a barrier, at  
13       least for the smaller residential system, they're  
14       probably not for the larger systems, but for the  
15       smaller residential systems maybe those, or, you  
16       know, some kind of hybrid system is something we  
17       should be looking at.

18               MS. AGUILLON: You know, I would  
19       recommend, really recommend that we go with a  
20       pilot program, because this is a very different  
21       market. My company, Kyocera, has an office in  
22       Germany, and obviously our headquarters in Japan.  
23       Two different programs, two different markets.

24               When we come to the U.S. and it's  
25       another different market with different ways, you

1 know, consumers are different. And if we can --  
2 there is money set aside for a pilot program. If  
3 we can do something, keep it as a pilot without  
4 disturbing what's going on in the market, then we  
5 can see whether -- would you do that, yourself, in  
6 your home? Would you just take a loan out for  
7 \$20,000 today and get, what, 30 cents a kilowatt  
8 hour?

9 MR. HECKEROTH: I did.

10 MS. AGUILLON: But that's, you know, I'm  
11 asking myself would I do it, or would you do it.  
12 So I think if we could have a pilot where we  
13 actually test it, and we see how people will  
14 react, I think it's better for us to make analysis  
15 than for us to just say, well, this might work.

16 Because, you know, in Japan it worked  
17 the other way. In Japan you have meters that are  
18 actually really cute; they're like LCD displays  
19 and they have a little cloud when it's cloudy, it  
20 shows you there is a cloud over the array, and it  
21 tells you how many kilowatt hours you're getting  
22 at that point. When it's sunny, it shows you the  
23 cute little sun and then how much. When it's, you  
24 know, night, it tells you like the little moon  
25 comes out. I mean it's really adorable.

1                   But it tells you the information about  
2                   what your system is producing; and what's going on  
3                   with it. And people look at it. And if something  
4                   doesn't look right, and it's in their living  
5                   rooms, it's wireless. Actually Kyocera sells it,  
6                   but I'm not advertising it.

7                   (Laughter.)

8                   MS. AGUILLON: Anyway, --

9                   UNIDENTIFIED SPEAKER: Yes, you are.

10                  MS. AGUILLON: No, no, we don't have any  
11                  yet. But people can see that. And they go, oh,  
12                  wait, it's not producing as much -- people really  
13                  really -- these are Japanese, and Japanese are  
14                  known in the world to be very, you know, not  
15                  careless about purchasing and about bargaining and  
16                  about doing anything like that. But, yet, they  
17                  care about that.

18                  MS. MacFARLAND: On the meters, Sheryl,  
19                  a residential meter can cost about \$100. That's  
20                  not installation costs. And remote reading meters  
21                  are like \$400. And if you had a wide application  
22                  of them over time they would probably decrease in  
23                  cost.

24                  And I think because of the RECs issue,  
25                  they're going to be required anyway. So, they're



1 not (inaudible).

2 MS. CARTER: Well, I don't know. My  
3 husband got mad at me and said we just cost the  
4 systems a half a cent a kilowatt hour, but I'm not  
5 an expert on that, so --

6 MS. SMITH: The concept of a pilot is  
7 really important to get at some of these issues,  
8 and to understand how the California market, which  
9 is so large, differs from some of these other  
10 markets, so that we can get it right. Not go  
11 halfway down the road and then have to correct and  
12 go down a different road.

13 MS. MacFARLAND: I still think, no  
14 matter what we do, even if we come up with  
15 whatever the system is, and we set it up we're  
16 always going to need data, and we're always going  
17 to need reasoned analysis.

18 And, you know, adjustments. It's  
19 happened in the German program; it's happened in  
20 the -- Japan; it's happening at the CEC. And  
21 that's something that we have to build into a  
22 long-term market, or plan.

23 MR. HECKEROTH: Whatever it is, though,  
24 it would be nice if the state stepped in. Like  
25 PG&E, I have a net metering agreement with PG&E,

1 and I get a stack of papers every month. But it  
2 doesn't mean much to me. It's just for a  
3 residential system.

4 And I've heard Southern California  
5 Edison has reduced that to one page. So if there  
6 is a one-page system that could be used, then why  
7 receive a stack of papers every month. I mean  
8 it's like 30 pages of printouts that you can't  
9 decipher.

10 MS. MacFARLAND: They say it's  
11 expensive.

12 (Laughter.)

13 MR. HECKEROTH: Yeah, and it must make  
14 it a lot more expensive, too.

15 MS. MacFARLAND: There are hard costs to  
16 net metering, and that might be one of--

17 MR. BLAIR: We, in the four net metered  
18 systems we have, we get one spreadsheet a month  
19 that tells us what the net of two meters. Now,  
20 they're all over 30 kW size, but it's a one-page  
21 report.

22 MR. TUTT: Some of those meters that  
23 have just been talked about, some of the things in  
24 the presentations today talked about the  
25 importance of feedback, and feedback inside the

1       home. And so, I mean eventually that's probably  
2       where we would want to go, or have the industry  
3       go, is to have those kind of systems where the  
4       homeowner doesn't have to go out back of the  
5       garage or in the back corner of the house and  
6       squint and read a small LCD display.

7               MR. HECKEROTH: There's a lot of  
8       monitoring systems that are coming out you can  
9       read on your cellphone from anywhere in the world.  
10      Just call it up and there it is, real time.

11             MR. TUTT: I think we should spend some  
12      time talking about the last question on the  
13      agenda, solar on new homes built in California.  
14      And so, we had a lot of presentations about that.  
15      It's a new program potentially in California,  
16      proposed in part by the Governor in his State of  
17      the State Address. We don't know what details  
18      he'll come out with.

19             SMUD's been active in this area. So, we  
20      talked about mandates and incentives, being part  
21      of the building standards or not in the  
22      presentations.

23             I'm interested in again the role  
24      utilities would or could play in this. And it may  
25      sort of tie in with performance-based incentives.

1       It might be a place to start out a performance-  
2       based incentive program, since it's kind of  
3       separate from our current retrofit program in  
4       California. That might be a way to transition  
5       into something in that regard.

6               Any thoughts?

7               MR. ALLEN: I would just say if you can  
8       address the issue of if you want utilities to, you  
9       know, step up and be proactive, address the value  
10      of the renewable energy credit towards RPS and  
11      you'll stimulate their activity. And will  
12      actually motivate them to be proactive to develop  
13      the market, instead of a barrier.

14              The other thing is we'll need to raise  
15      the meter caps if you're going to stimulate that  
16      kind of a market real quick, which will be  
17      probably a legislative fix, I'd imagine.

18              MR. TUTT: Can I question that a little  
19      bit, Tor, in the sense that it might be a  
20      reasonable value to the utility, but the total  
21      amount of RECs that are coming from this, today's  
22      level of solar installations in the state don't  
23      contribute a substantial percentage to their  
24      required RPS increment.

25              MR. ALLEN: Well, the projected new home

1 market --

2 PRESIDING MEMBER GEESMAN: Even though,  
3 did somebody say that Germany was at 300 or 400  
4 megawatts per year?

5 UNIDENTIFIED SPEAKER: 500, yeah.

6 PRESIDING MEMBER GEESMAN: You know,  
7 that 's a small drop in the bucket to the  
8 utilities' RPS obligations. So I think that it's  
9 something that you ought to address independently  
10 of whether it's a meaningful target for them or  
11 not. But I think, as a motivator, you're going to  
12 have to find something else.

13 MS. MacFARLAND: We also think it's a  
14 really important customer motivator because, in  
15 large part, the reason why they're purchasing the  
16 system is for those attributes, and we'd like them  
17 to own them.

18 I guess one thing I haven't brought up  
19 about new homes, I talked a little bit about it  
20 with Sheryl earlier today or yesterday, is that,  
21 you know, we really believe it should be zero,  
22 energy efficiency, thermal and PV. And I think  
23 it's going to be very important for the builders  
24 or maybe some manufacturers that end up doing it,  
25 I mean I'd guess it would be probably the

1 manufacturers, there needs to be a one-stop shop  
2 to combine those incentive programs together.  
3 Because you don't want them to go to the PUC  
4 for -- and I don't know how we do that in a  
5 legislative sense.

6 But it strikes me that some efficiency  
7 on where you get your funding, if we can create  
8 that funding, it's going to be very important, so  
9 it's not too much of a pain to go to too many  
10 places.

11 MS. CARTER: I think a partnership model  
12 would be a good one, and it's not something you  
13 necessarily legislate or want to legislate, but  
14 you have the utilities doing new construction  
15 programs and working on supporting the building  
16 codes and standards set here at the Commission.

17 And, you know, the package that we've  
18 been talking about, Jan, and that I mentioned  
19 earlier, in terms of, you know, a home that meets  
20 title 24 and substantially exceeds it, and  
21 includes photovoltaics, would need to include the  
22 utilities, both investor-owned and municipal, the  
23 builders. And because they already work together  
24 on energy efficiency part of it, as well as the  
25 manufacturers and installers in the solar

1 community to put something like that together.

2 And in terms of, you know, there's  
3 energy efficiency funding for the energy  
4 efficiency measures above, substantially --

5 MS. MacFARLAND: Right.

6 MS. CARTER: -- above title 24, there's  
7 some funding, although dwindling. And we need to  
8 perhaps find more for the PV measures.

9 But without needing to cross-subsidize  
10 even between, and not even worrying about that  
11 aspect of it, if you actually evaluated the whole,  
12 as a home, instead of looking at, okay, we've  
13 already done the energy efficiency measures, but  
14 then when we look at the PV we never look at the  
15 whole package. We just look at what's already  
16 there and put it on top of it.

17 Well, that doesn't take into account the  
18 benefits of the package. So, you know, I think  
19 more of a partnership model on that. I don't know  
20 how you'd legislate something like that.

21 MS. MacFARLAND: No, but I think we can  
22 figure that one out.

23 MR. RAYMER: Okay, CBIA gets together at  
24 the state level to deal with its membership three  
25 times a year, three annual meeting. And one of

1       our committees is our construction codes and  
2       energy committee. Meets for four hours, and the  
3       first two hours is energy issues.

4               And we always have a presentation by the  
5       Public Utilities and by SMUD on their latest new  
6       home energy programs.

7               It's varied over the years. There's  
8       been sporadic application of it, but by and large  
9       they keep us up to speed on what's available and  
10      when things are going to stop. But it occurs to  
11      me that for the last couple of years they've had  
12      programs in place that have consistently provided  
13      incentives to go above and beyond, at 15 percent  
14      levels and 25 percent levels above and beyond the  
15      state energy efficiency.

16              The reason for that is to reduce  
17      consumption so that particularly during peak load  
18      time periods the drain on the grid is not felt as  
19      heavily from the new construction.

20              What difference does it make if that's  
21      coming from a photovoltaic application? If I'm  
22      dense, I don't understand why they care.

23              MS. MacFARLAND: Well, we actually think  
24      we are a DSM option. In our spare time we haven't  
25      been able to weigh in on all the efficiency



1 proceedings, but I think there was an IST decision  
2 that was made, but when was that?

3 UNIDENTIFIED SPEAKER: Two years ago.

4 MS. MacFARLAND: Two years ago, that  
5 treated PV like a demand side option.

6 MR. RAYMER: Um-hum.

7 MS. MacFARLAND: But we've never  
8 formally been treated that way.

9 We argue that we should be. We also --  
10 the other thing that's important is we don't want  
11 one without the other. We have to do both. And  
12 actually all three because there is thermal that's  
13 not occurring --

14 MS. CARTER: I was trying to stay away  
15 from getting into the distinction between, you  
16 know, whether the PV is a demand side option. I  
17 consider PV to be a generation option. but it's  
18 an argument that I don't like to get into because  
19 there should be no tradeoffs.

20 We should be doing all cost effective  
21 energy efficiency; we should not be having to --  
22 when we talked about giving credits under title 20  
23 for PVs earlier, I don't know if everybody  
24 understood what that actually means. That means  
25 that you would forego some of the energy

1 efficiency measures that we've already gotten  
2 through the title 24 improvements, and put PV in  
3 its stead.

4 What I'm talking about in terms of the  
5 package is an over and above. We do all cost  
6 effective energy efficiency because it is cost  
7 effective. And we combine that with PV because  
8 you need all cost effective energy efficiency to  
9 make sure that you can get your PV system down to  
10 a reasonable level that customers can afford.  
11 That's another way to get costs down for these PV  
12 systems.

13 So I want to stay away from getting into  
14 the pitting argument. I don't even think we  
15 should go there; we don't need to go there. And  
16 we shouldn't, because, you know, we need both in  
17 this state, and there's no room for tradeoffs.

18 MR. RAYMER: We certainly can't go there  
19 quickly. I think in terms of the legislative  
20 cycle, particularly the bill that's out there  
21 right now, looks at a 2006, January 2006 effective  
22 date.

23 And while I eventually see PVs becoming  
24 part of a global energy requirement that the state  
25 would be enforcing, trying to get that

1 accomplished in a competent way without disrupting  
2 what we've done over the last 20 years is going to  
3 be impossible to do over the next year to year and  
4 a half of regulatory forum.

5 I do want to make one comment about --  
6 Ken Nittler brought up an interesting point. He  
7 has been working for decades in energy efficiency,  
8 and then as a strong member in CABEC, the Energy  
9 Consultants Association, and he developed software  
10 to help comply with the standards.

11 He raised an interesting point that  
12 hasn't been explored. And that is two climate  
13 zones out of California's 16, I think it's 14 and  
14 15, the high desert climate zones, when the new  
15 regs take effect in the fall of 2005, there's  
16 going to be a rather perplexing problem.

17 The regs are incredibly stringent in  
18 those zones. You're going to be looking at the 20  
19 percent glazing window requirement where you may  
20 be able to up that a little bit by going from  
21 instead of a 13 SEER to maybe a 14.5. That'll get  
22 you to 23 percent windows.

23 A lot of marketable housing in that area  
24 may well have 28 or 30 percent. Is there an  
25 opportunity to somehow encourage them, although

1       there certainly wouldn't be the cost tradeoff  
2       issue here. But for a marginal increase in window  
3       area, which is probably the only tradeoff they'd  
4       be interested in. Just say, look, if you put in  
5       photovoltaics I know you're going to lose about 20  
6       to 30 grand on the operation, but in those huge  
7       homes that would go in there, that's something for  
8       consideration.

9               But that's down the road and there's  
10       just no way that we could -- and right now the  
11       bill has a paragraph that says the Energy  
12       Commission should look into doing this. And we  
13       simply don't agree with that.

14               PRESIDING MEMBER GEESMAN: I guess I'd  
15       raised, Sheryl, for you to give some thought to,  
16       if you restricted the tradeoff to additional  
17       glazing, and perhaps take the two climate zones  
18       Bob's talking about, what's the argument against  
19       allowing that additional glazing if the customer  
20       puts PVs in?

21               I mean I know that we do something like  
22       that for the increased efficiency air conditioner.  
23       Why would PV be any different?

24               MS. CARTER: But the current tradeoffs  
25       we have, I believe, and I haven't run numbers and

1 I'm not our codes expert, but the current  
2 tradeoffs that we have are between different types  
3 of energy efficiency measures.

4 PRESIDING MEMBER GEESMAN: That's not  
5 what I'm talking about. I'm talking about buying  
6 extra glazing in essence by including  
7 photovoltaics in your home design.

8 MS. CARTER: Well, you know, I continue  
9 to have a concern about why we even need to make a  
10 tradeoff and reduce the energy efficiency, reduce  
11 the energy efficiency of the home in order --

12 PRESIDING MEMBER GEESMAN: Guy wants  
13 more windows.

14 MS. CARTER: -- to add PVs.

15 PRESIDING MEMBER GEESMAN: The guy wants  
16 more windows.

17 MR. RAYMER: I think the point here is  
18 not in all the other 14 climate zones, but in the  
19 two that I mentioned, I think you will be at a  
20 point to where you simply don't have tradeoffs.  
21 About the only option left would be tankless water  
22 heater and a higher efficiency air conditioning,  
23 which chances are you've already plugged into your  
24 calculations.

25 PRESIDING MEMBER GEESMAN: Right.

1                   MR. RAYMER: It's not going to be the  
2                   capabilities, the high level of flexibility you  
3                   have in the other zones. And those particular two  
4                   zones, you basically are at the envelope. It's a  
5                   very tight standard and you don't have any more  
6                   option to pick and choose from.

7                   So, is this a possible option that's out  
8                   there. I didn't necessarily want the conversation  
9                   to go that way, but in those two zones you've got  
10                  a unique situation for a change. The regs have  
11                  gotten so tight there's no more tradeoffs.

12                 PRESIDING MEMBER GEESMAN: And I'm  
13                  further into this than I should be because I'm --

14                  (Laughter.)

15                  MS. CARTER: As am I.

16                  PRESIDING MEMBER GEESMAN: -- 22 years  
17                  past the last standards that I knew about.

18                  MS. SMITH: I wanted to respond to the  
19                  role of the utilities that you were asking about  
20                  earlier. And one thought is, you know, that the  
21                  utilities deliver electrons to the customer,  
22                  whereas the PV industry actually delivers capacity  
23                  to the customer. Still on the customer's side.

24                  And so to build on what the gentleman  
25                  from SMUD said earlier about the customer really

1       absorbing a certain amount of risk for the  
2       utilities, both in terms of private investment and  
3       also absorbing some of the natural gas price  
4       volatility that we all see on the horizon, so  
5       there is a natural benefit of having PV on the  
6       customer's side. The customer absorbs half of the  
7       cost.

8               And so in response to the role of the  
9       utilities, from my view it would be to really  
10      facilitate the interconnection of the PV system to  
11      the distribution grid. And to make that process  
12      as seamless as possible to be able to move as much  
13      PV onto the market as quickly as possible. And  
14      work in partnership with the utilities in the  
15      manner, involving the greatest amount of  
16      competition between the corporations and companies  
17      that have made that their livelihood, to provide  
18      the best PV possible on the international market.  
19      Really bring down the cost by investing in  
20      innovation, and bringing that to the customer.

21              And the utilities' role would then be to  
22      be able to facilitate that market in California.

23              PRESIDING MEMBER GEESMAN: Well, I  
24      think, Kari, I believe that as a philosophical  
25      construct. And, you know, I am familiar with that

1 issue. In the 1970s Tom Hayden and I spent an  
2 inordinate amount of time persuading Jerry Brown  
3 that that was the right way to look at things.

4 And as a consequence the budding utility  
5 role in solar hot water heating was immediately  
6 canceled out.

7 But now we're in a situation where the  
8 elected Governor suggests that we really ought to  
9 be looking at scaling our existing program to  
10 75,000 to 80,000 units a year in new construction.  
11 I don't know how you get from 5000 to 75,000 or  
12 80,000. And I don't know what your horizon is.  
13 Call it five years, call it ten years for that  
14 matter. I don't know how you get there without  
15 the level of standardization, absorption of risk,  
16 provision of warranties, maintenance, inspection  
17 without some constructive role for the utility.  
18 And a larger role than I've ever previously  
19 thought acceptable.

20 If somebody can tell me how these  
21 cottage industry, small farmer models of the  
22 individual self-reliant home generator gets to  
23 that number, I'm happy to explore it further.

24 MS. SMITH: I guess I would suggest that  
25 GE is not a small farmer.



1                   PRESIDING MEMBER GEESMAN: No, and I  
2                   doubt Kyocera is or Sharp, for that matter, or RWE  
3                   Schott. And it looks to be the people that we're  
4                   going to end up doing business with if we're going  
5                   to get to that scale program.

6                   And the utilities are of comparable  
7                   size, at least for terms of mating purposes, I  
8                   guess, if you will. It seems to me we're supposed  
9                   to bring institutions like that together.

10                  MS. SMITH: Constructive would be the  
11                  key word.

12                  MS. MacFARLAND: Constructive, I think,  
13                  is important. It's been unfortunately pretty  
14                  hostile towards solar, -- the view that we're too  
15                  expensive. We deal with a lot of passive/  
16                  aggressive filings where they say there's no value  
17                  to solar --

18                  PRESIDING MEMBER GEESMAN: Yeah, but  
19                  it's wind they really harbor the special feelings  
20                  for.

21                  (Laughter.)

22                  MS. MacFARLAND: That's true, but  
23                  intermittency. But, you know, I do think there  
24                  ultimately will be a role for utilities. There  
25                  was a day when Carl Weinberg was quite the leader

1 at PG&E. And it wasn't a hostile environment.

2 In fact, some of the best, Tom Hoff,  
3 Howard Ringer, Dan Sugar, there were a lot of  
4 solar leaders there.

5 But I really think it's a partnership  
6 between the manufacturers, the new construction.  
7 It's the most economically efficient approach is a  
8 partnership between the manufacturers and the  
9 builders. And to have open, transparent  
10 information like they do have in Germany. And  
11 where we can figure out, through a reasoned  
12 approach, the analysis, the appropriate roles for  
13 the utilities over time.

14 And I think SMUD and DWP and others will  
15 eventually, the IOUs may not always be hostile  
16 towards it, either. And I don't think all of them  
17 are. You know, some of them have just come out of  
18 bankruptcy and haven't been focusing on anything  
19 else, too.

20 But, it's also a fox in the hen house  
21 thing.

22 MR. RAYMER: As I'm sure most of you  
23 know, our industry's changed substantially in  
24 terms of the relative number of units per year  
25 that a company does. We still have lots of small

1       builders and medium-size builders, you know, those  
2       that are doing less than a dozen units a year,  
3       those that are doing up to 50.

4               But we've got the mega members, if you  
5       will, that are doing thousands. And they have an  
6       interest in this; they have an interest in all  
7       sorts of things. And those are certainly where  
8       the lion's share of this type of a partnership, on  
9       a regional basis. And I think through pilot  
10      programs where you think out loud and get together  
11      a collection of things.

12             And then everybody's a partner on it;  
13      they've worked together; they get it implemented;  
14      and they learn from doing that. And fortunately,  
15      by doing it that way, you at least have people  
16      that enter into it with a smile on their face, as  
17      opposed to be shoved over the cliff, so to speak.

18             MS. TURNBULL: I'd just like to make  
19      certain that the munis don't get left out of this.  
20      They are 30 percent of the power that's generated  
21      out there. And we are supporting their  
22      involvement in the RPS because we think everybody  
23      has to play the same game across the state.

24             MR. RAYMER: I agree, and quite frankly,  
25      SMUD, we always wait for SMUD's presentation at

1       our meetings because that's kind of the high  
2       point.

3               MS. MacFARLAND:  And we're thrilled that  
4       SMUD's going to share their data and it's really  
5       going to help --

6               MR. RAYMER:  Why is that so difficult?  
7       You know, we had that problem in the '80s and the  
8       '90s at the PUC of getting our hands on data to  
9       see how well certain things were working.

10              MS. MacFARLAND:  How to make them  
11       better.

12              MR. RAYMER:  Exactly.  And it's --  
13       (Laughter.)

14              PRESIDING MEMBER GEESMAN:  It's a  
15       premise written into the Public Utilities Code  
16       which the Legislature's trying to change this  
17       year.  We'll see if Senator Bowen is successful in  
18       doing that.  But it's really interwoven throughout  
19       the Public Utilities Code; and they simply have a  
20       particular approach toward what they characterize  
21       as proprietary data that makes it very difficult.

22              MR. RAYMER:  And therein lies the  
23       problem, what they characterize.  In my  
24       discussions with Joseph Desmond last week he told  
25       me and our CEO that that's one of the areas that

1       they're aggressively seeking, not to unveil hidden  
2       truths or, you know, trade secrets or whatever,  
3       but just some generic information that would be  
4       very good to --

5               PRESIDING MEMBER GEESMAN:  Yeah.

6               MR. RAYMER:  -- capsulize.

7               MR. HECKEROTH:  I think we're  
8       overlooking some advantages to developers that  
9       might really move PV along.  The last time I  
10      talked to Mike Keesee, the 93 Premiere homes that  
11      they're putting PV on, there was 400 customers  
12      waiting for those homes.

13              And the same thing happened down with  
14      Shea homes.  Those sold out way ahead of any other  
15      homes in the developments.  And Steve forgot to  
16      mention, I think, when he was talking about SMUD's  
17      Pioneer program that people actually paid a  
18      premium to have solar on their roof.  It wasn't  
19      that the utility was putting up all the money to  
20      make up the difference between what PV cost as  
21      opposed to the other.

22              And there is all kinds of statistics  
23      that say that everybody wants solar.  So, if we  
24      can use that as a way to encourage the home  
25      builders to move forward with this, I think the

1 public will come up and make it all to their  
2 advantage.

3           Particularly when the company I work  
4 for, UniSolar Ovonics is making a building-  
5 integrated photovoltaic which will function as the  
6 roofing at the same time. And then there's  
7 further economy, something about lowering the cost  
8 of PV when you offset the cost of the roofing at  
9 the same time. Then you can get down to that \$4 a  
10 watt a lot quicker than if you're putting a roof  
11 on and then putting PV on top of it.

12           MR. RAYMER: The fact of the matter is  
13 with new residential construction right now the  
14 market has been extremely hot for the past three  
15 to four years. Our projections are through the  
16 Construction Industry Research Board that it will  
17 remain incredibly vital. We'll be doing over  
18 200,000 units a year for at least the next couple  
19 of years. So that's taking us well into 2006.

20           Right now in the Sacramento area,  
21 Silicon Valley, L.A., San Diego you build a home,  
22 it's sold, end of story. And right now the prices  
23 you're seeing, what's happening with the prices,  
24 it's not being overly dramatic to say it's insane  
25 what's going on with the prices today.

1                   It's not necessarily a function that it  
2           has solar, but it certainly makes it a  
3           distinguishable quantity from a lot of other  
4           production building that's been going on in the  
5           area. And it's a pleasant surprise that it didn't  
6           deter people away.

7                   There have been some negative feedback  
8           from the early '80s and some of our earlier  
9           adventures with solar. That doesn't seem to have  
10          turned people away anymore. And so it's a good  
11          thing.

12                   But the fact of the matter is, today you  
13          build a house, it's going to sell. We're the  
14          single hottest part of the economy right now. And  
15          it looks like we'll stay that way for several  
16          years.

17                   COMMISSIONER PFANNENSTIEL: You know, as  
18          the discussion's gone on we seem to be saying both  
19          sides of this, whether incentives are absolutely  
20          necessary and certain levels of incentives will  
21          bring more customers on. And clearly, the higher  
22          the incentives the more customers will go and  
23          adopt solar.

24                   But then we also hear how customers  
25          really want, new home buyers really want solar.

1 Even when it may not be in their financial  
2 interest.

3 So I think that, you know, there's some  
4 discussion about doing a pilot. I'm still not  
5 sure how much incentive we need. Do we need a  
6 pilot to prove that? Is it basic marketing? You  
7 know, we're talking about running out of incentive  
8 money, and you know, does that mark the end of the  
9 program or is it already situated and it's just a  
10 matter of building, rhetorical questions all, but  
11 I think that as we're discussing this I'm not  
12 quite sure where I'm supposed to draw the  
13 conclusion.

14 MS. MacFARLAND: I think the end of  
15 incentives are essentially the end of the programs  
16 for now. But with a ten-year commitment we  
17 wouldn't need incentives anymore.

18 And the first thing I heard from Bob  
19 Raymer when I sat down with him is he wanted to  
20 make sure there were incentives there for awhile;  
21 along with time-of-use rates. And I can't  
22 remember what the other one was.

23 MR. RAYMER: We have an array of  
24 these --

25 MS. MacFARLAND: But couple --



1                   MR. RAYMER:  -- and keep in mind, as I  
2           did my presentation today, just like we did for  
3           energy efficiency going beyond, we're not  
4           looking -- the local governments didn't have money  
5           they could just give to us.  None of them did.

6                   But we were able to get 60 of them to  
7           embrace going beyond the regulations by giving us  
8           things other than direct cash value items.  So  
9           there's a lot of options out there, but you do  
10          need to explore them, and you don't do it by  
11          statewide mandate.

12                  And I must say, not veering off, but a  
13          mandate will bring with it certain obligations  
14          that you will most likely inherit as a Commission,  
15          and that is some rather amazing administrative  
16          requirements and oversights that you're then be  
17          blessed upon the local governments.  And how  
18          you're going to do that quickly, by 2006, good  
19          luck.

20                  MR. TUTT:  I think that -- just a second  
21          -- I think we're moving into some kind of a timing  
22          issue here.  We talk about pilot programs and  
23          that's different than a production rollout  
24          program, obviously.

25                  I wanted to ask Bob a question, as we

1 sit here in June of 2004, how many of the 200,000  
2 units that will be built in 2005 are already at a  
3 point in their planning timeline where it's  
4 difficult to add solar to the process?

5 MR. RAYMER: If we're talking about the  
6 integrated systems, what I would consider the  
7 preferable product, probably about half. Your  
8 purchasing agents are probably already getting  
9 down on paper their allotments, the shipments for  
10 roofing product. You don't want to wait until the  
11 last minute to take care of that because of the  
12 fluctuation of lumber and everything else. And so  
13 you want to have your hands on all this.

14 You don't want to stockpile stuff, but  
15 you at least want to have a very secure chance  
16 that you're going to have these trucks coming in in  
17 this particular time period.

18 Having said that, I'm saying that you  
19 don't necessarily need legislation to kick off  
20 pilot programs. And a lot of what you were  
21 talking about, your long-term proposal, it might  
22 need some legislative assistance, but a whole lot  
23 of that would be interaction between the industry,  
24 your industry, my industry and assistance by state  
25 and local government. That would be a big help.

1 MS. MacFARLAND: Yeah, I see a scenario  
2 where we could bring the top builders and the  
3 manufacturers together with some other interested  
4 parties, and sit down and -- I mean, there were  
5 1000 homes done last year. I don't know if the  
6 number is 10,000 or what it is.

7 But we could figure out a scale-up over  
8 time that was real, that was backed by purchase  
9 orders, where we were delivering the products that  
10 they wanted. I mean that's the whole thing. We  
11 need to hear what that is that they want; how to  
12 combine the efficiency pieces.

13 And I don't think -- it's not rocket  
14 science, either. I think reasonable minds -- and  
15 I wouldn't necessarily call it a pilot. I'd call  
16 it a memorandum of understanding backed by  
17 purchase orders. And have it be real, which is  
18 better than a mandate sometimes, too.

19 And then make sure -- we have to make  
20 sure it's a pleasurable experience for them.

21 MR. TUTT: Ben, you had a point or a  
22 comment to bring -- come up --

23 MR. OVSHINSKY: Do I have to come to a  
24 mike?

25 MR. TUTT: Yeah, you do.

1                   MR. OVSHINSKY: Ben Ovshinsky, ECD  
2           Ovonics, parent company to UniSolar. I'm not a  
3           technical expert in any of this, but I do have a  
4           sense of we're in the trees and not seeing the  
5           forest. And where I operate I'm looking at it  
6           like 50,000 feet up higher.

7                   And what I sense in this kind of  
8           conversation, which I think is very good, is we're  
9           -- and people are just beginning to see it,  
10          perhaps -- we're on the cusp of a new paradigm. I  
11          think the word paradigm came up a few times  
12          earlier.

13                   And that paradigm is where residential  
14          houses, commercial buildings, anything with a roof  
15          on it, already existing or newly to be  
16          constructed, from here on out becomes part of the  
17          grid. It becomes part of the system of  
18          electricity production, distribution, consumption  
19          and every aspect of it. And how much you pay for  
20          it and how much it costs and policies on it. And  
21          all the benefits that accrue from that,  
22          environmentally, energy security, et cetera, et  
23          cetera, et cetera.

24                   And we're not looking at it from the new  
25          paradigm point of view yet. We're foundering down

1 on the old, looking at it from the old paradigm.

2 I don't have a suggestion as to what  
3 that new paradigm will look like, but it's going  
4 to be complex and it's going to make partners out  
5 of, unfortunately it looks like, functionally and  
6 existentially it's going to make partners out of  
7 people who own homes or live in homes or work in  
8 buildings.

9 MR. TUTT: We have a couple of slides  
10 from Aaron from Sharp that look at the timing of  
11 new home installations in Japan and California, so  
12 just illustrative of what paths we're on.

13 MR. NITZKIN: Some of you might have  
14 seen this slide previously. This is a slide that  
15 was prepared just analyzing the market in Japan.  
16 And you can see the green line is the percentage  
17 of PV systems, the number of PV systems as a  
18 percentage of housing starts.

19 And you can see in 1996 and '97 -- from  
20 '96 and '97 it bumps up to close to 2 percent  
21 after being relatively flat at around .5 percent.  
22 1997 was the first year in Japan they started  
23 putting PV systems on production buildings.

24 And since 1998, the second year after  
25 that happened, you see a significant spike. Now,

1       if we look at California, where do we stand today.  
2       Very -- next to identical. Up to the year 2000  
3       very flat at about .5 percent. And 2001, the  
4       first year that PV was installed on production  
5       building it popped up close to 2 percent. So  
6       we've had now two years of data.

7               I do not have 2003 data yet, but I think  
8       we have to recognize that in Japan this growth  
9       happened because of long -- again those key  
10      factors, long-term commitment of funding, long-  
11      term commitment of product development, long-term  
12      commitment by the builders.

13             In Japan there is a significant  
14      synergies where the builders and manufacturers  
15      actually sit down and develop products together  
16      and actually have built the industry.

17             And that's, you know, going back to  
18      Jan's comment of trying to get everyone in a room  
19      together, that's what we have to do if we want to  
20      continue to replicate what happened in Japan. And  
21      we are doing so, so far. And I just think we have  
22      to recognize that this is a critical point in that  
23      process.

24             MR. TUTT: And can you -- you talked  
25      about the partnership in Japan, the builders and

1 the industry. What about the utility role? What  
2 happened there in Japan, do you know?

3 MR. NITZKIN: I don't know.

4 MS. AGUILLON: I have just one comment  
5 from Kyocera. Not a single utility has gone out  
6 of business either in Japan or in Germany.

7 UNIDENTIFIED SPEAKER: Well, they don't  
8 do that here, either.

9 (Laughter.)

10 MS. AGUILLON: I say that to one of our  
11 utilities. I told them that, what are you afraid  
12 of. But it's initial control, because we are  
13 peaking power.

14 And of course they did not like it. The  
15 utilities in Japan and in Germany did not like it.  
16 Do you hear them? No.

17 MR. TUTT: Okay, any other questions or  
18 comments from anybody?

19 MS. AGUILLON: The builders loved it.

20 MR. HECKEROTH: I just wanted to second  
21 what Ben said. I think part of that paradigm  
22 shift is moving toward a new aesthetic based on  
23 efficiency rather than historical bits and pieces  
24 of wood and tile. We have new large area  
25 materials and we should be using them to build our

1 homes in the future.

2 And UniSolar now has 30 megawatts of  
3 production, so we're ready. And we're a U.S.  
4 company.

5 PRESIDING MEMBER GEESMAN: I think we're  
6 done. This has been very productive. I think it  
7 will create a very rich transcript, something that  
8 we need to go over, I think, repeatedly and  
9 determine where to go next.

10 Thank you, all, for participating.

11 (Whereupon, at 4:46 p.m., the workshop  
12 was adjourned.)

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## CERTIFICATE OF REPORTER

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